MECHANICS · AUTOS · HOMEBUILDING

POPULAR SCIENCE

December 35c

MONTHLY

Copyrighted material

Cannot channel

Easy to clean

Filters out all dirt

Traps moisture

Never needs replacing

Reduces friction

Rigid double-cone construction

Save Oil and Money with the New *Micro* BRONZE

PERMANENT ALL-METAL FILTER

Increases engine life

Waterproof

Saves detergents

Saves engine repairs

1. Eliminates Engine Acids
2. Traps Damaging Moisture
3. Filters all the Dirt
4. Reduces Friction
5. Saves the Detergents

U. S. Patent App. No. 464498

Unaffected by pressure

Unconditionally guaranteed

Screens out abrasives

WHY GIVE YOUR ENGINE HALF-WAY PROTECTION? The Micro Bronze permanent all-metal filter with the built-in acid neutralizer is the world's first filter that guards against *all five* engine enemies: Acids, abrasives, friction, moisture and sludge.

Made of solid but porous everlasting sintered bronze, the Micro Bronze Filter screens out *all* particles of dirt and abrasives larger than .00023 inch in size (so small you could put a thousand of them on the head of a pin!). The Micro Bronze positively cannot channel . . . operates efficiently at all temperatures . . . never wears out, never needs replacing, merely occasional cleaning.

SAVES OIL CHANGES . . . SAVES DETERGENTS. Your oil is good for at least 10,000 miles with a Micro Bronze Filter. All the valuable additives are saved. You never need buy another replacement pack! Used with modern detergent oils, Micro Bronze will add thousands of miles to engine life, help prevent loss of engine power, save costly oil changes, pack replacements and engine overhauls!

DOES YOUR PRESENT FILTER PASS THE "ACID" TEST? If you have a Micro Bronze Filter with the built-in Acid Neutralizer your engine is getting the full protection it needs! In a simple test you can easily make yourself, the Micro Bronze special element completely neutralizes acids in 60 seconds!

BUILT-IN ACID NEUTRALIZER!

THE SINTERED METALS SECRET . . . Before World War II, the Germans discovered how to fuse microscopic balls of metal into solid but porous form. Following the war, this secret was made available to American industry and we've developed it for Micro Bronze Filters. This is a magnification of the filter wall.

NO EXTRA COST FOR FULL FLOW MODELS!

FITS EVERY CAR & LIGHT TRUCK. A Micro Bronze Unit costs only $6.95, *including all full-flow models.* Easy to install, never needs changing. Micro Bronze Filter Housing $9.95 for all cars with no filter equipment (does not include element). Use the easy-order coupon now.

Efficient at all temperatures

Easy to install

Saves oil

Fits all cars

All-metal construction

Micro BRONZE FILTER CORP.
11766 W. Pico Blvd., Los Angeles 64, Calif.
Cable Address: MICRONZE

Eliminates acid

Built-in acid neutralizer

DISTRIBUTORS WANTED

We are receiving orders from all over the world for the amazing Micro Bronze Filter, and are setting up exclusive distributorships to handle our rapidly growing dealer organization. Write, wire or phone.

FILTERS THE DIRT BUT NOT THE DETERGENTS

Micro Bronze Filter Corp. Dept. PS-125
11766 W. Pico Blvd., Los Angeles 64, Calif.

Please ship the following at once

☐ Conversion unit $6.95 *(including all full-flow models)*

☐ Micro Bronze Housing Unit (Needed where car does ***not*** now have filter) $9.95 (does not include element)

Enclosed is $_____ full price. Factory pays all shipping costs to your door.

MAKE, MODEL & YEAR CAR _____

NAME _____

ADDRESS _____

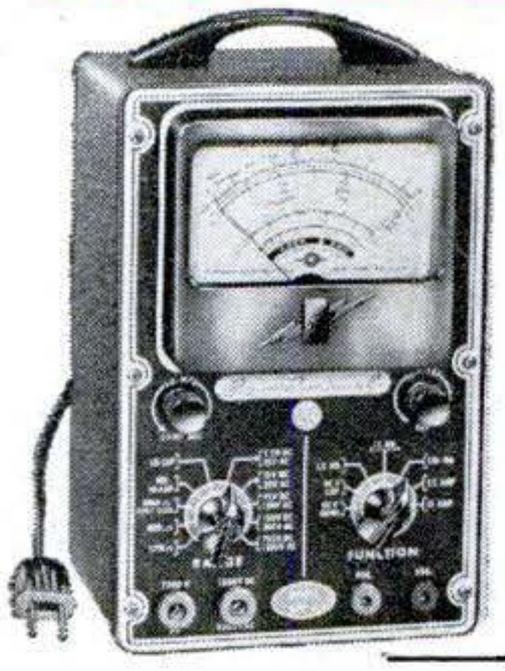
CITY _____ ZONE ____ STATE _____

Copyrighted material

FOR REPAIRING RADIO AND TV

The New Model 670-A

SUPER METER



A COMBINATION

VOLT-OHM MILLIAMMETER PLUS CAPACITY REACTANCE INDUCTANCE AND DECIBEL MEASUREMENTS

ADDED FEATURE:

Built in ISOLATION TRANSFORMER reduces possibility of burning out meter through misuse.

SPECIFICATIONS:

D.C. VOLTS: 0 to 7.5/15/75/150/750/1,500/7,500 Volts
A.C. VOLTS: 0 to 15/30/150/300/1,500/3,000 Volts
OUTPUT VOLTS: 0 to 15/30/150/300/1,500/3,000 Volts
D.C. CURRENT: 0 to 1.5/15/150 Ma. 0 to 1.5/15 Amperes
RESISTANCE: 0 to 1,000/100,000 Ohms 0 to 10 Megohms
CAPACITY: .001 to 1 Mfd. 1 to 50 Mfd. (Good-Bad scale for checking quality of electrolytic condensers.)
REACTANCE: 50 to 2,500 Ohms 2,500 Ohms to 2.5 Megohms
INDUCTANCE: .15 to 7 Henries 7 to 7,000 Henries
DECIBELS: −6 to +18 +14 to +38 +34 to +58

The Model 670-A comes housed, in a rugged crackle-finished steel cabinet complete with test leads and operating instructions. **28.40**

The new streamlined model TC-55

TUBE TESTER

QUICKLY AND EFFICIENTLY TESTS RADIO AND TV TUBES INCLUDING: SEVEN PIN MINIATURES; EIGHT PIN SUBMINARS, OCTALS AND LOCTALS; NINE PIN NOVALS

YOU CAN'T INSERT A TUBE IN THE WRONG SOCKET.
It is impossible to insert the tube in the wrong socket when using the new Model TC-55. Separate sockets are used, one for each type of tube base. If the tube fits in the socket it can be tested.

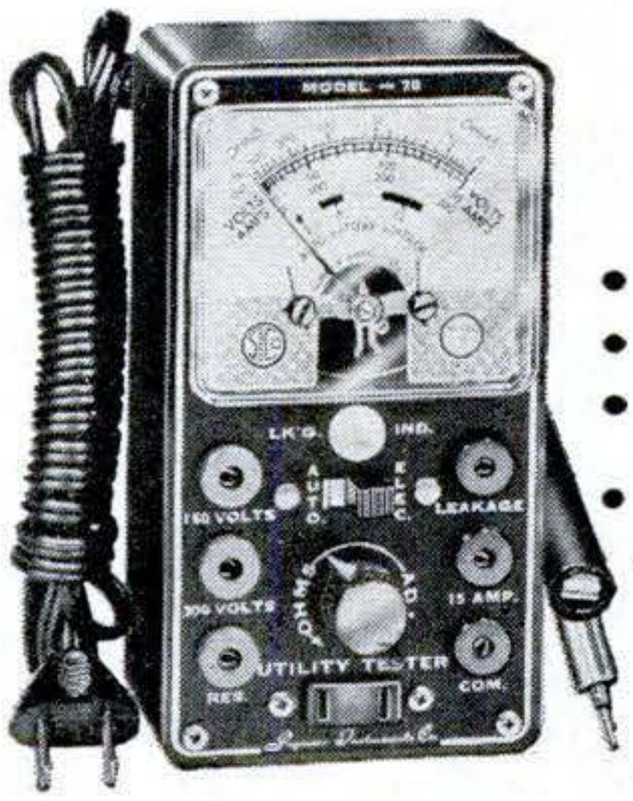
"FREE-POINT" ELEMENT SWITCHING SYSTEM.
The Model TC-55 incorporates a newly designed element selector switch system which reduces the possibility of obsolescence to an absolute minimum. Any pin may be used as a filament pin and the voltage applied between that pin and any other pin, or even the "top-cap."

CHECKS FOR SHORTS AND LEAKAGES BETWEEN ALL ELEMENTS.
The Model TC-55 provides a super sensitive method of checking for shorts and leakages up to 5 Megohms between any and all of the terminals.

ELEMENTAL SWITCHES ARE NUMBERED IN STRICT ACCORDANCE WITH R.M.A. SPECIFICATION.
One of the most important improvements, we believe, is the fact that the 4 position fast-action snap switches are all numbered in exact accordance with the standard R.M.A. numbering system. Thus, if the element terminating in pin No. 7 of a tube is under test, button No. 7 is used for that test.

The Model TC-55 comes complete with operating instructions and charts. Use it on the bench—use it for field calls. A streamlined carrying case, included at no extra charge, accommodates the tester and book of instructions. **26.95**

FOR REPAIRING ALL ELECTRICAL APPLIANCES MOTORS AND AUTOMOBILES



The New Model 70 UTILITY TESTER

As an electrical trouble shooter the Model-70:

- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, Leakage, etc.
- Will measure current consumption *while the appliance under test is in operation.*
- Incorporates a sensitive direct-reading resistance range which will measure all resistances commonly used in electrical appliances, motors, etc.
- Leakage detecting circuit will indicate continuity from zero ohms to 5 megohms (5,000,000 ohms).
- Will test Toasters, Irons, Broilers, Heating Pads, Clocks, Fans, Vacuum Cleaners, Refrigerators, Lamps, Fluorescents, Fans, Switches, Thermostats, etc.

As an Automotive Tester the Model 70 will test:

● Both 6 Volt and 12 Volt Storage Batteries ● Generators ● Starters ● Distributors ● Ignition Coils ● Regulators ● Relays ● Circuit Breakers ● Cigarette Lighters ● Stop Lights ● Condensers ● Directional Signal Systems ● All Lamps and Bulbs ● Fuses ● Heating Systems ● Horns ● Also will locate poor grounds, breaks in wiring, poor connections, etc.

Handsome round-cornered molded bakelite case, 3⅛"x5⅞"x2¼". Complete with all test leads. Also included is a 64 page book giving detailed instructions for testing all electrical appliances, automotive equipment, etc. Only 15.85

SHIPPED ON APPROVAL

NO MONEY WITH ORDER — NO C.O.D.

Try any of the above instruments for 10 days before you buy. If completely satisfied then send down payment and pay balance as indicated on coupon. **No Interest or Finance Charges Added!** If not completely satisfied return unit to us, no explanation necessary.

MOSS ELECTRONIC DISTRIBUTING CO., INC.
Dept. D-185, 3849 Tenth Ave., N. Y. 34, N. Y.
Please send me the units checked. I agree to pay down payment within 10 days and to pay the monthly balance as shown. It is understood there will be no finance, interest or any other charges, provided I send my monthly payments when due. It is further understood that should I fail to make payment when due, the full unpaid balance shall become immediately due and payable

Name .....

Address .....

City .....Zone.. State.....

☐ **Model 70 . . .Total $15.85 $3.85 within 10 days. Balance $4.00 monthly for 3 months.**

☐ **Model 670-A. Total $28.40 $7.40 within 10 days. Balance $3.50 monthly for 6 months.**

☐ **Model TC-55. Total $26.95 $6.95 within 10 days. Balance $5.00 monthly for 4 months.**

Copyrighted material

Founded in 1872,
Vol. 167: No. 6

POPULAR SCIENCE
REG. U. S. PAT. OFF. *Monthly*

Mechanics and Handicraft
REG. U.S. PAT. OFF.

America's Leading New-Idea Magazine for 83 Years

DECEMBER, 1955

He Built His House of Foam 81
New "Comet" to Cruise at 500 M.P.H. 84
Science Is Popular in Toyland Now 94
Automatic Drive Runs Old Rockin' Chair .. 99
They Hit 'Em When They Can't See 'Em 100
We'll Soon Ride Jet Flying Boats 104
Ford Designs a Body for a Gas Turbine 108
America's Favorite Christmas Windows 112
Do-It-Yourself Jewelry Is Booming 116
New TVs Are Bigger, More Powerful 119
Power Carts Fire Up Jets 126
Lanky Tanks Avert A-Blast 127
He's Hollywood's Kindest Killer 128

News of 7 New Cars

Chevrolet ***132***
Studebaker ***135***
Buick ***139***
Hudson ***142***
Nash ***143***
MG ***145***
Oldsmobile ***146***

Gus Plays a Double Role 150
One-Evening Workbenches Made from Kits 153
Boring Bits You Should Know About 162
Extension Reel Puts Light on Job 167
First Aid for Universal Motors 169
Four Gifts You Can Make Quickly 182
How to Build a Good Dining Table 184
Caster Scooter for the Toddler 196
Slide Viewer Made from Cans 202
TV Picture Tubes Have Nine Lives 204
A Diabolo Is Fun to Make and Fly 210
Aerial Tram Gives Kids a Big Lift 212
Is It Noise or Music? 213
How to Make a Rocket Weather Vane 216
Building a Wobble Sander 220

(More features and departments are listed on page 4)

Editor
VOLTA TORREY

Managing Editor
HOWARD ALLAWAY

Art Editor
HOWARD C. JENSEN

Associate Editors
Alden P. Armagnac, Devon Francis, Martin Mann, Herbert O. Johansen, Sheldon M. Gallager, Henry B. Comstock, Herbert R. Pfister, Stanley Beitler, Frank Dorr, Maryann Smith, Erik H. Arctander

Art
Harry Samuels (Director), Herbert Anthony, Gene Butera, Eric A. Karminski Jr., Henry W. Kazmirowski, Dana B. Rasmussen, Laylen H. Sweet

Copy
Kendall W. Goodwyn (Director), Everett H. Ortner, Georgette Sparks, Ruth Westphal

Photography
W. W. Morris (Director), Hubert Luckett, Orlando Guerra

Assistant Managing Editors
Frank Rowsome Jr.
Robert P. Stevenson

Mechanics and Handicraft
Harry Walton

Pacific Coast Editor
Wesley S. Griswold (Los Angeles)

Editorial Assistants
Rosa Lee Beeland (Chief), Roberta Lester, Louise Levis, Roberta Marks

Publisher
GODFREY HAMMOND

President
RALPH H. FLYNN

Advertising Manager
LEE P. ADAMS

Circulation Director
EUGENE WATSON

ADVERTISING OFFICES:
NEW YORK—353 Fourth Ave.
CHICAGO—360 North Michigan Ave.
DETROIT—820 Book Bldg.
SAN FRANCISCO—114 Sansome St.
CLEVELAND—328 Citizens Bldg.
LOS ANGELES—1127 Wilshire Blvd.
PORTLAND, ORE.—520 S.W. Sixth Ave.

EDITORIAL OFFICES: 353 Fourth Avenue, New York 10, N. Y.

Published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, Chairman of the Board; Ralph H. Flynn, President and Treasurer; Franklin E. Parker Jr., Secretary; Eugene Watson, Vice-President. Second-class mail privileges authorized at New York, N. Y. and Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U.S.A.
Copyright, 1955, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all the countries participating in the International Copyright Convention and Pan-American Copyright Convention.
Single copy 35c. Subscriptions to United States, its possessions, and Canada, 1 year $3.40 (2 years $6.00, 3 years $8.00). Elsewhere, 1 year $6.00 (2 years $11.00, 3 years $16.00). Four weeks' notice is needed to change a subscriber's address. Please give both old and new addresses, including postal zone numbers.

Copyrighted mater

TRADE IN YOUR FREE HOURS FOR A FULL, RICH FUTURE

Few investments pay off like the wise investment of free time. Here's what the hours of self-improvement you spend today can mean to you tomorrow . . .

— **success** enough to command responsible, interesting positions.

— **money** enough to live comfortably and graciously.

— **leisure** enough to enjoy your family and friends, your interests and hobbies.

AN HOUR A DAY PAVES YOUR WAY

There's a fuller, richer future waiting for *you.* Hurry it up! You can do it by studying with I. C. S. in your spare time, at your own pace. No interference with work or social life. In one hour after supper each night, you can master any one of 277 I. C. S. Courses.

I. C. S. METHOD BRINGS QUICK RESULTS

"I obtained a Civil Service professional rating one year short of the time required to complete a college engineering course," reports A. P. A., Wyomissing, Penna. Courses are direct, job-related. Bedrock facts and theory plus practical application. Complete lesson and answer service. Easy-pay plan. Diploma to graduates.

3 FREE BOOKS

(1) Illustrated catalog of opportunities in field that interests you. **(2)** 36-page guide to advancement, "How to Succeed." **(3)** Sample lesson (Math) showing I. C. S. method. Just mark the coupon and mail it today!

For Real Job Security—Get an I. C. S. Diploma! **I. C. S., Scranton 9, Penna.** Member, National Home Study Council

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS

BOX 32314M, SCRANTON 9, PENNA. (Partial list of 277 courses)

Without cost or obligation, send me "HOW to SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

ARCHITECTURE and BUILDING CONSTRUCTION
- ☐ Air Conditioning—Refrig.
- ☐ Architecture
- ☐ Architectural Interior
- ☐ Building Contractor
- ☐ Building Maintenance
- ☐ Carpenter and Mill Work
- ☐ Estimating
- ☐ Heating
- ☐ Painting Contractor
- ☐ Plumbing
- ☐ Reading Arch. Blueprints

ART
- ☐ Cartooning
- ☐ Commercial Art
- ☐ Fashion Illustrating
- ☐ Magazine Illustrating
- ☐ Show Card and Sign Lettering
- ☐ Sketching and Painting

AUTOMOTIVE
- ☐ Auto Body Rebuilding
- ☐ Auto Elec. Technician
- ☐ Auto-Engine Tune Up
- ☐ Automobile

AVIATION
- ☐ Aeronautical Engineering Jr.
- ☐ Aircraft & Engine Mechanic

BUSINESS
- ☐ Advertising
- ☐ Bookkeeping and Accounting
- ☐ Business Administration
- ☐ Business Correspondence
- ☐ Public Accounting
- ☐ Creative Salesmanship
- ☐ Federal Tax
- ☐ Letter-writing Improvement
- ☐ Office Management
- ☐ Professional Secretary
- ☐ Retail Business Management
- ☐ Sales Management
- ☐ Stenographic-Secretarial
- ☐ Traffic Management

CHEMISTRY
- ☐ Analytical Chemistry
- ☐ Chemical Engineering
- ☐ Chem. Lab. Technician
- ☐ General Chemistry
- ☐ Natural Gas Prod. & Trans.
- ☐ Petroleum Engineering
- ☐ Plastics
- ☐ Pulp and Paper Making

CIVIL, STRUCTURAL ENGINEERING
- ☐ Civil Engineering
- ☐ Construction Engineering
- ☐ Highway Engineering
- ☐ Reading Struct. Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Engineering
- ☐ Surveying and Mapping

DRAFTING
- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Mine Surveying and Mapping
- ☐ Plumbing Drawing and Estimating
- ☐ Structural Drafting

ELECTRICAL
- ☐ Electrical Engineering
- ☐ Electrical Maintenance
- ☐ Electrician ☐ Contracting
- ☐ Lineman

HIGH SCHOOL
- ☐ Commercial ☐ Good English
- ☐ High School Subjects
- ☐ Mathematics

LEADERSHIP
- ☐ Foremanship
- ☐ Industrial Supervision
- ☐ Leadership and Organization
- ☐ Personnel-Labor Relations

MECHANICAL AND SHOP
- ☐ Gas—Electric Welding
- ☐ Heat Treatment ☐ Metallurgy
- ☐ Industrial Engineering
- ☐ Industrial Instrumentation
- ☐ Industrial Supervision
- ☐ Internal Combustion Engines
- ☐ Machine Design-Drafting
- ☐ Machine Shop Inspection
- ☐ Machine Shop Practice
- ☐ Mechanical Engineering
- ☐ Quality Control
- ☐ Reading Shop Blueprints
- ☐ Refrigeration
- ☐ Sheet Metal Worker
- ☐ Tool Design ☐ Toolmaking

RADIO, TELEVISION
- ☐ Industrial Electronics
- ☐ Practical Radio TV Eng'r'ng
- ☐ Radio and TV Servicing
- ☐ Radio Operating
- ☐ Television Technician

RAILROAD
- ☐ Air Brakes ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Section Foreman

STEAM AND DIESEL POWER
- ☐ Combustion Engineering
- ☐ Diesel—Elec. ☐ Diesel Eng's
- ☐ Electric Light and Power
- ☐ Stationary Fireman
- ☐ Stationary Steam Engineering

TEXTILE
- ☐ Carding and Spinning
- ☐ Cotton, Rayon, Woolen Mfg.
- ☐ Finishing and Dyeing
- ☐ Loom Fixi'g ☐ Textile Des'ing
- ☐ Textile Eng'r'g ☐ Throwing
- ☐ Warping and Weaving

MISCELLANEOUS
- ☐ Domestic Refrigeration
- ☐ Marine Engineering
- ☐ Ocean Navigation
- ☐ Professional Engineering
- ☐ Short Story Writing
- ☐ Telephony

Name_____ Age_____ Home Address_____

City_____ Zone_____ State_____ Working Hours_____ A.M. to P.M._____

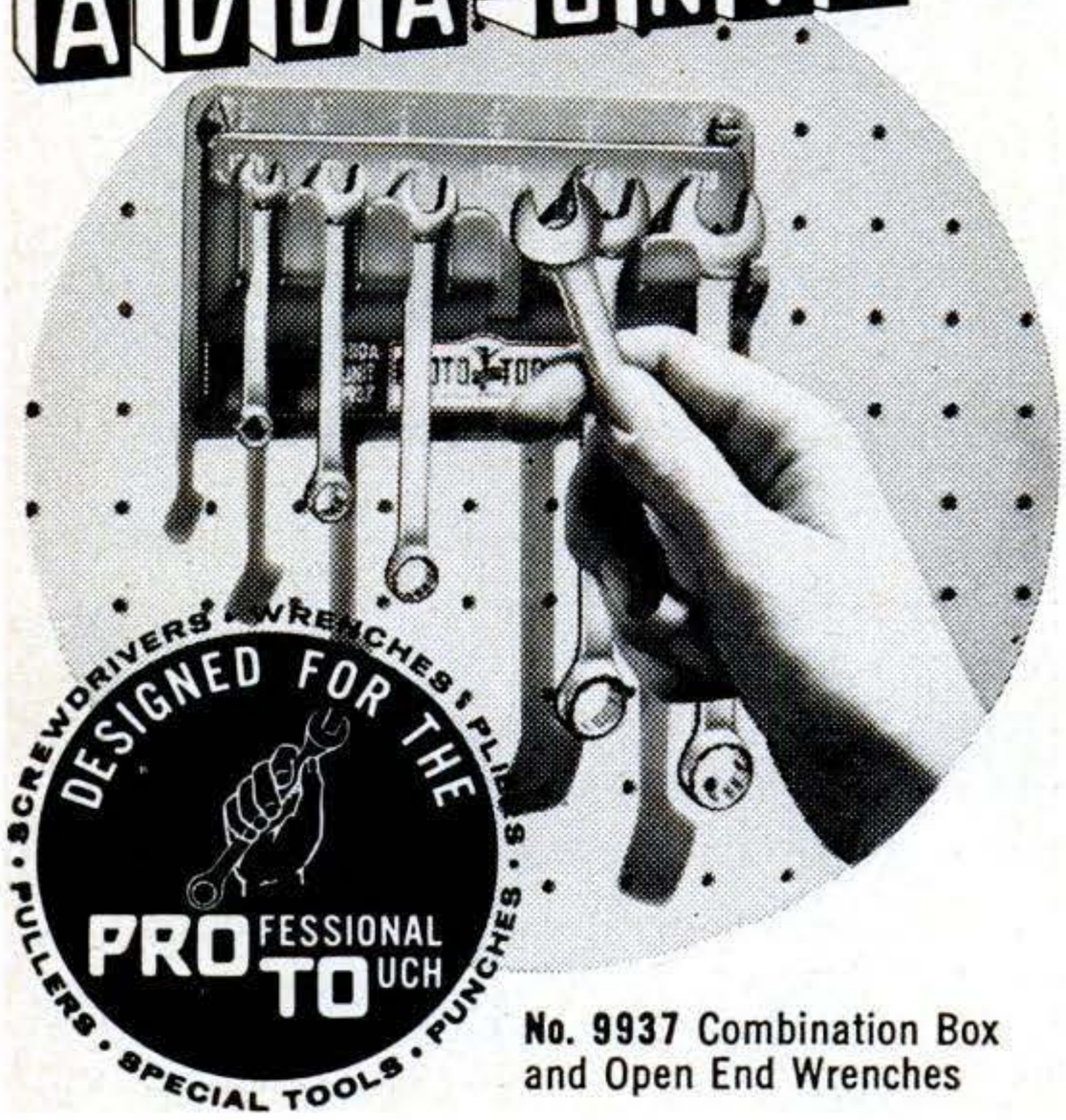
Occupation_____

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

Copyrighted material

Build A Master Tool Set with Low-Cost PROTO

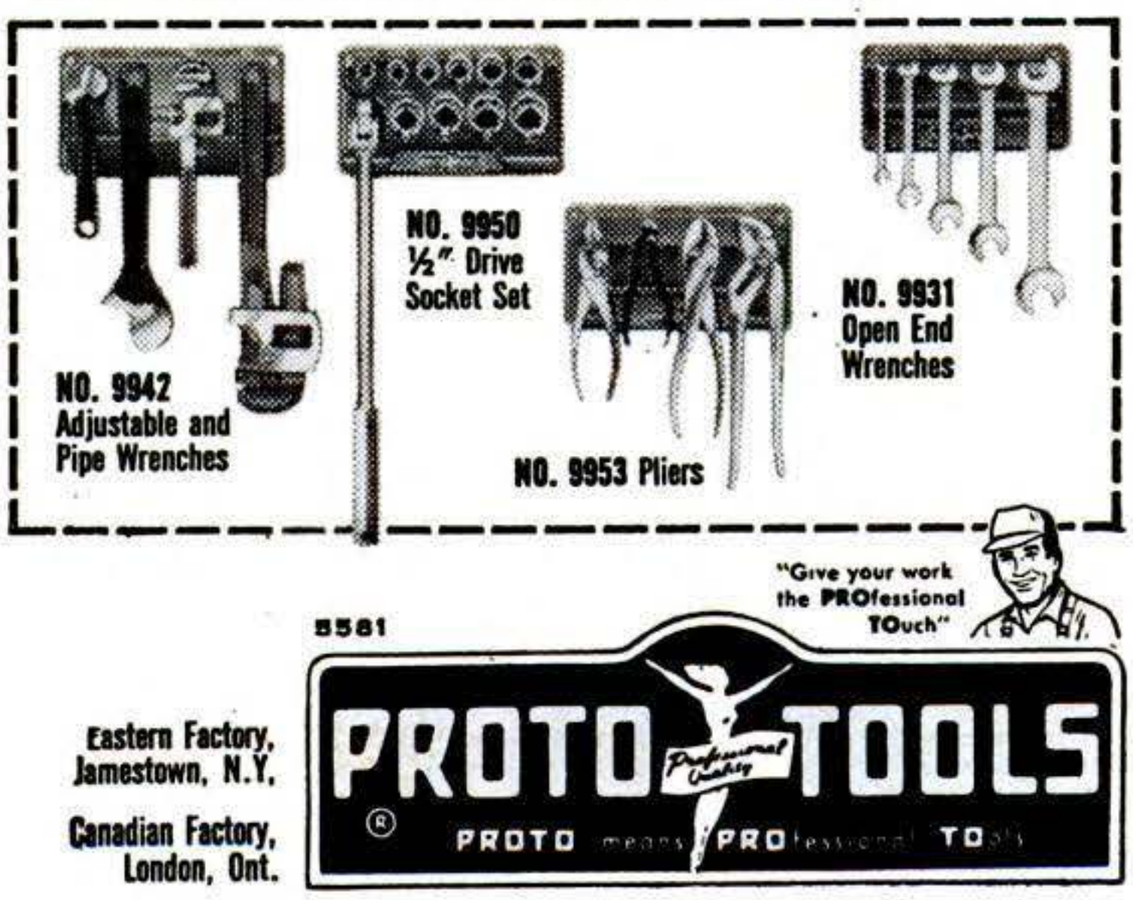
ADDA-UNITS



No. 9937 Combination Box and Open End Wrenches

Now, you can buy the PROTO Professional-Quality Tools you always wanted, the economical ADDA-UNIT way — as your budget permits. Each unit is a set of highly useful tools in the handiest tool holder ever designed for a workshop. The holders are made of a bright red plastic and are custom molded to hold each tool snugly. They keep your tools where you want them—when you want them —and they add a sparkle of color that makes any workshop a showplace. Start your master PROTO tool set today by getting one or more ADDA-UNITS from your PROTO dealer. Send 10¢ for 68-page catalog of entire line to

PLOMB TOOL COMPANY
2257E Santa Fe Ave., Los Angeles 54, Calif.



News and Pictures

Solar Heat Melts Minerals..... 83
New Solder May Cut Cost of TV Tubes.. 86
Powerful Radar Lights Lights..... 87
Trapped Sunlight Powers Rural Phones.. 88
New Fixtures Put More Light in Mines.... 92
Farmer Strafes Mice from Air..... 92
Truck-Train Follows the Leader..... 93
Walkie-Talkie Carhops Speed Service..... 98
Geiger Counter Works in Car..... 98
Largest Building to Top R.R. Station.....102
Kapok Harvesting, Anyone?.....103
Navy's First Midget Submarine.....110
Shelter Filters Atomic Dust.....110
Tiny Things Make Big Things Go.....111
7,800 Christmas Lights Light Up Farm..118
Ground Nozzles Douse Fire.....118
Moving Sidewalk Turns Corners.....123
Pilot Shifts Weight to Control Copter.....124
Mirror and Lights Guide Pilots.....125
Tricks of the Trade in Cars Abroad.....149

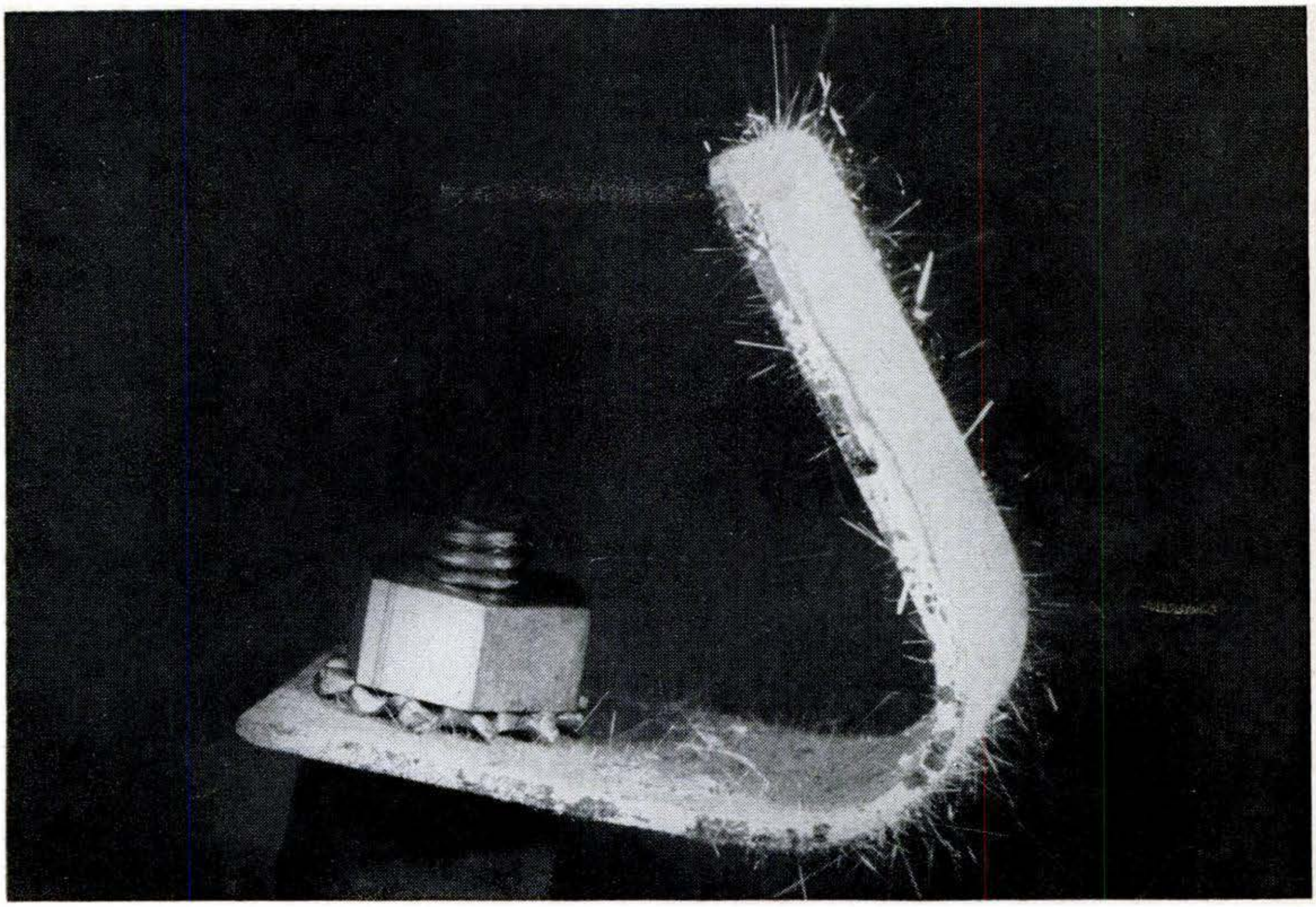
Mechanics and Homebuilding

Drill Accessories You Can Make.....158
Wooden Jig Clamps Miter Joints.....159
Clothespin Holds Lag Screw.....161
Bike Rack Made in an Evening.....165
Two Wire Strippers Give Pro Touch.....166
Auto Parts Put Spring in Toy Bronco.....174
Iron Strap Makes Bumper Hitch Solid....178
6 Uses for Old Keys.....181
2 Poor Christmas Trees Make Good One..191
Homemade Jack Raises Floor.....194
Platform Locks Down Garbage Pail.....194
Chimney Socket Holds TV Mast.....198
Five Darkroom Tips.....201
Clothespin Shoots Arrows into Can.....208
Car Wheel Makes Kids' Race-Car Hub....209
Wallpaper Seals Christmas Packages.....226
Jar Holds Pencil Shavings.....226
Jig Carries Wide Board Across Saw.....230
Two-Slope Catch Is Automatic.....230

Departments

Letters 16
Craftsmen at Work..... 76
PSM Late News..... 78
New Ideas from the Inventors..... 89
I'd Like to See Them Make.....107
New Aids to Living.....130
New Tools.....160
Hints from the Model Garage.....175
New for Your Car.....177
Almanac for Motorists.....178
New Shop Ideas.....179
Do It the Easy Way.....191
Wordless Workshop.....192
New for the Handy Man.....195
Keeping the Home Shipshape.....199

Copyrighted material



Whiskers on tin-plated steel, enlarged 6 times. Immense yield strength of metals in whisker form was discovered by Bell scientists.

The clue of the metal whiskers

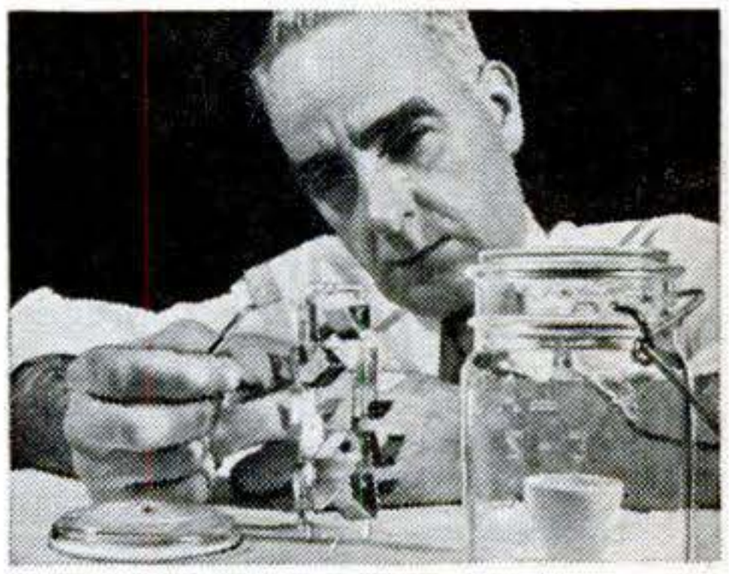
The habit of close observation at Bell Laboratories often turns "tremendous trifles" into important scientific progress. Such a case occurred when unexplained short circuits in wave filters seemed to be associated with a small zinc-plated mounting bracket.

Close scrutiny disclosed a whiskery growth on the zinc plating. Similar whiskers of tin were found growing on tin-plated equipment. Studies showed the whiskers to be tiny single crystals of metal.

Suspecting that these unusual crystals might be of essentially perfect structure, alert Laboratories scientists saw an opportunity at last to test an important metallurgical theory.

The scientists studied the whiskers, grew larger ones, and showed that the crystals had enormously high yield strength as predicted by the theory for perfect crystals – a strength far greater than for the same metal in any other known form. This clue has opened new frontiers in the study of what makes metals strong or weak, and has excited metallurgists all over the world.

Thus, another new advance comes from the Bell Telephone Laboratories practice of scrutinizing *everything* that means better telephone service.



Through the study of thousands of specially cultivated whiskers, Bell scientists seek to prevent treacherous growths in telephone equipment.

BELL TELEPHONE LABORATORIES

IMPROVING TELEPHONE SERVICE FOR AMERICA PROVIDES CAREERS FOR CREATIVE MEN IN SCIENTIFIC AND TECHNICAL FIELDS

Copyrighted material

IN RETURN FOR CHARACTER

...A CAREER

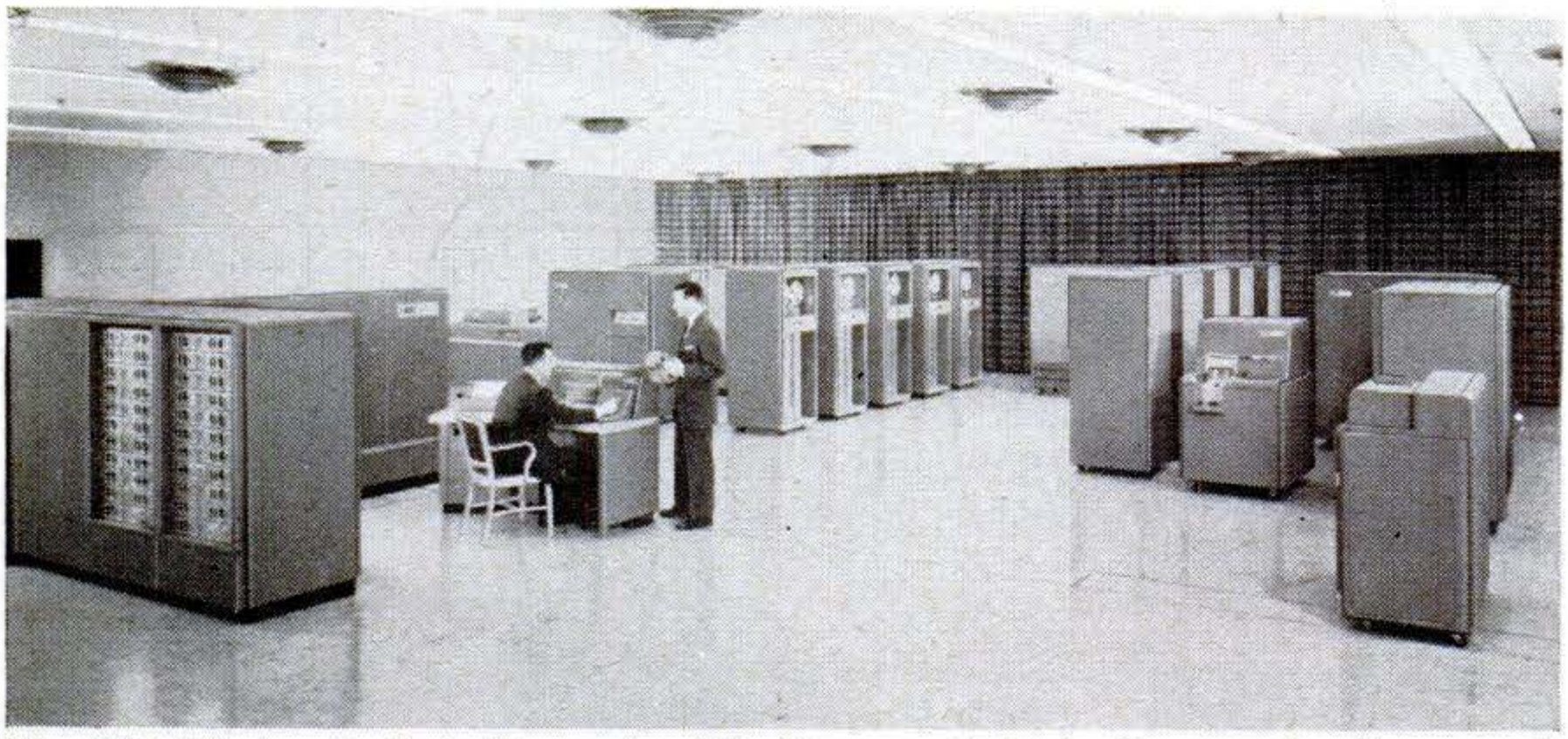
Because the finest single attribute anyone can offer is character, this, basically, is what IBM asks of its people, whatever their special aptitudes or abilities. IBM offers them in return—not just a job—but a career.

IBM electronic field technicians, for instance, receive more than training and early responsibility; they have the opportunity to work with the world's largest computer, use all the latest testing equipment, employ the finest computer testing techniques yet devised.

Above all, they have the satisfaction of joining the electronics industry's most advanced program, destined for long-range national importance.

You could ask for no finer future.

If you are between 19 and 32 and have at least a 2-year technical school background, with emphasis on electronics, you can do important work on COMPUTER INPUT-OUTPUT functions. Write: Nelson O. Heyer, Room 3712, IBM, Neighborhood Rd., Kingston, N. Y.



The 702 Electronic Data Processing Machine, typical of advances that have made engineering work at IBM one of the most provocative experiences in electronics.

INTERNATIONAL BUSINESS MACHINES CORPORATION

590 Madison Avenue,
New York 22, N.Y.

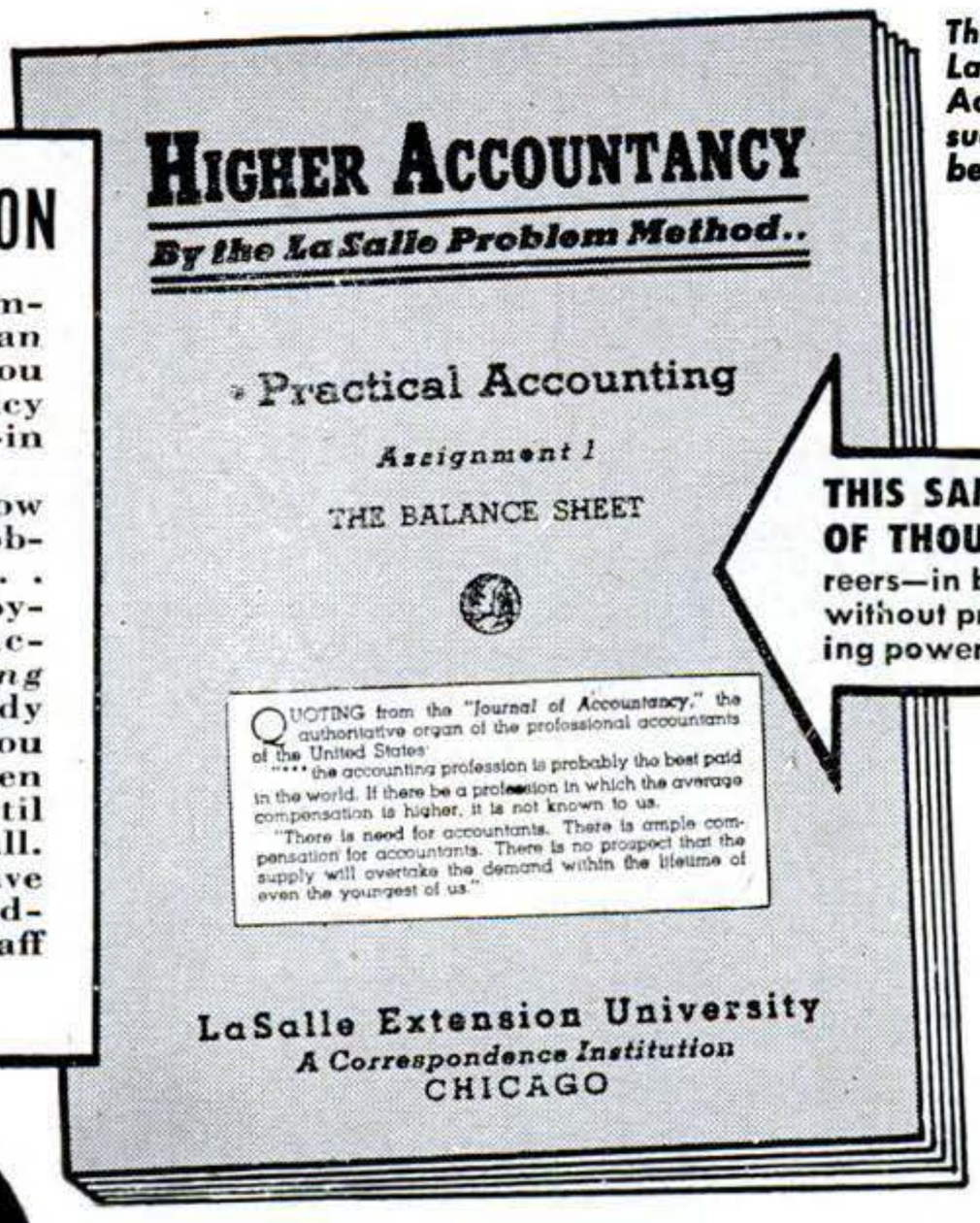
IBM ®

Producer of electronic data processing machines, electric typewriters, and electronic time equipment

Copyrighted material

This *FREE SAMPLE LESSON* will prove you can become an expert BOOKKEEPER . . . ACCOUNTANT OR C.P.A.

This well-paid LaSalle-trained Accountant's success could be yours.



FREE SAMPLE LESSON

We offer you this free sample lesson so that you can *prove to yourself* that you CAN master Accountancy—quickly, thoroughly—in spare time at home.

You will see exactly how LaSalle's famous "Problem Method" works . . . how you are led step-by-step through actual accounting work—*learning by doing* and not by study of theory alone. First you tackle easy problems, then more difficult ones—until soon you master them all. And at every step you have the close personal guidance of LaSalle's large staff of C.P.A. instructors.

THIS SAME LESSON HAS STARTED HUNDREDS OF THOUSANDS toward well-paid accounting careers—in business, government, and as C.P.A.'s. Even without previous knowledge, progress is rapid—earning power climbs fast. This sample lesson shows why.

Nearly 10% of all C.P.A.'s in the U.S. have been trained by the LaSalle Problem Method

IF you have been envying the high incomes and good jobs enjoyed by thousands of men and women Accountants today . . . incomes ranging from $4,000 to $10,000 and more per year . . . why not launch such a career for yourself?

Do you doubt that you can?

Then let us send you—without cost or obligation—the same Lesson Number One with which LaSalle has started several hundred thousand men and women toward successful accounting careers. We want you to see for yourself how this remarkable method, originated by LaSalle, makes Accountancy simple, interesting, practical, and certain . . . how it leads you step-by-step to a complete mastery of Accounting—and on up to the coveted degree of Certified Public Accountant if you so aspire.

It doesn't matter whether you've had previous bookkeeping experience, or whether you don't know a debit from a credit. Whether you wish to qualify as an expert bookkeeper, advanced accountant, cost accountant, auditor, government accountant, income tax specialist, or public accountant . . . you'll find in LaSalle's Problem Method the exact plan to prepare you rapidly and inexpensively—in spare hours at home—without losing a day from your present job.

So right now, today . . . if you are an adult, employed, and earnestly ambitious for rapid advancement in this highest-paying of all professions . . . send your name and address on the coupon below. We'll send the free sample lesson—plus our 48-page book outlining today's career opportunities and how you can qualify for them. A coupon like this has started many thousands toward greater success. It can do the same for you. Mail it today!

GOOD-PAY JOBS IN 5 BIG FIELDS

If you were an expert accountant right now, chances are you would find yourself among the highest-paid of all professional men and women. Surveys show that accountants earn more than those in other major professions.

There are five big fields of opportunity open to Accountancy-trained men and women . . . opportunities that are wide open and highly inviting, offering maximum income and job security in good times or bad. And under LaSalle's "Problem Method" you can start earning while still learning—either in spare-time or full-time employment . . . or in business for yourself with no capital required.

Get the latest information by sending for our 48-page book, "Accountancy, the Profession That Pays" . . . plus free sample lesson. The coupon at right will bring both to you without cost or obligation. LaSalle Extension, 417 S. Dearborn St., Chicago 5, Ill.

Clip Coupon . . . Mail TODAY!

LaSalle Extension University . . . *A Correspondence Institution*

Dept. 1283H, 417 S. Dearborn Street, Chicago 5, Illinois

YES, I want to see how LaSalle's "Problem Method" works...how I can qualify for high-pay Accountancy positions. Send Free Sample Lesson—also your 48-page book, "Accountancy, the Profession That Pays" ...all without cost or obligation.

Name.....*Age*.....

Street Address.....

City, Zone & State.....

Present Position.....

Copyrighted material

AMERICAN MACHINE & TOOL COMPANY
MODEL CHANGEOVER SALE
SAVE $8.00 ON THIS TILT ARBOR SAW

All year a great buy at regular price of $24.95—this 8-inch Plana Centric Tilt Arbor Power Saw is a spectacular bargain at $16.95 during model change-over period. This big saving is made possible by our patented construction, our manufacturing facilities, and our distribution methods. Top-quality saw features the original Plana Centric Patented Ball-Bearing Floating Drive, Patented Plana Centric Cradle Suspension, and Plana Centric Patented Rip Fence that locks front and rear against the table surface. Every part in this fine saw is manufactured in our own factories. All cast iron and steel construction. Crosscuts, rips, bevels, mitres, dadoes, cuts compound angles. Massive cast mitre gauge. Heavy steel base fastens to any workbench. Uses any standard 1/4 or 1/3 h.p. motor. INCLUDED: 8" Simonds Combination Blade at no extra charge. (Sells everywhere for $4.50.) We start soon on 1956 models. During model changeover you can have this fine 1955 at a saving of $8.00. Send check, M.O. or sent C.O.D.

LOOK AT ALL THESE SPECIAL FEATURES:

- Blade tilts, table stays level. Blade adjusts to any angle up to 50°.
- Single Hand Wheel Control. Tilts and tightens blade with a twist of the wrist. Blade rises and lowers; cuts from 0" to 2¼".
- Precision-ground cast iron table. Perfect flatness resists nicking and wear.
- Self-aligning rip fence. Adjustable to lie parallel to blade or give clearance either way.
- Patented Motor Mount takes any standard ¼ or ⅓ h.p. motor. Motor rides on ball bearing rollers. Keeps belt tight, transmits full power.
- Heavy long-lasting, all-metal construction. Built for a lifetime. Shipping weight 25 lbs.

WRITE FOR FREE CATALOG
BIG BARGAINS IN HOME WORKSHOP POWER TOOLS

FAMOUS AMERICAN IRONCLAD GUARANTEE

Try any Plana Centric power tool for ten days. If, for any reason, you are dissatisfied, return the merchandise for full and complete refund—no questions asked. This famous guarantee has been offered on sales of more than 3½ million power tools, and it has never been violated.

ALL POWER TOOLS SENT EXPRESS COLLECT

AMERICAN MACHINE & TOOL COMPANY
ROYERSFORD 18, PA.

HOW TO GROW ORCHIDS IN YOUR OWN HOME!

NO GREENHOUSE NEEDED
–ANY CLIMATE–MAINE TO CALIFORNIA . . . YEAR 'ROUND!

BIG PROFITS SPARE OR FULL TIME

Fill your home with gorgeous Orchids. Huge purple Cattleyas, exquisite Cymbidiums – dozens of others! Many grow without soil, getting food from the air. White Orchids, yellows, greens, every rainbow color. No equipment needed. Start on table or window ledge.

SUCCESSFUL HOME GROWER SHOWS YOU HOW! Complete instructions show you step-by-step how he and his wife started with a few plants and developed a big-profit home-business–grew an Orchid collection now worth a fortune. **Learn how orchids multiply,** how one plant may become many, each as valuable as the first. No big investment or overhead. Takes but a few minutes a week. Big-profit orders for plants and flowers come from individuals, florists, hotels, clubs, etc. Year 'round gift. Millions sold by Mail-Order.

Orchids have rewarded me richly – thanks to Tropical Flowerland.
S. V. SMART—Colorado

COMPLETE INSTRUCTIONS AND BLOOMING-SIZE ORCHID PLANT SENT FOR YOU TO EXAMINE AT HOME WITHOUT RISK. Secrets of the experts in simple language, jam-packed with "show-how" drawings, magnificent full-color pictures of Orchids. **Send No Money!** Write **NOW** for your **FREE FACTS** that show you how to learn to grow Orchids at home. Airmail is quicker.

TROPICAL FLOWERLAND, Dept. 212
4622 Wilshire Blvd., Los Angeles 5, Calif.

"TOOL UP" in comfort clothes
Anvil–Brand

TRUE—the better you feel the better you work. And the roomy ease of rugged working clothes is as satisfying as using efficient tools.

That is why thousands of craftsmen regularly buy Anvil Brand garments. In Anvil's variety there are fabrics, colors, patterns to suit all tastes, in long-wearing denims, tough twills and laundry-tested shirt materials. All action clothes!

Select an Anvil outfit at your favorite store and work in more clothes comfort.

ANVIL BRAND FACTORIES HIGH POINT, N. C.

Copyrighted material

We'll train & establish you in

Your Own Business

. . . even if now employed

We are enlarging this 25-year-old world-wide chain of Duraclean dealerships. Many excellent locations are still available in the U.S.A., Canada, and other countries. If you are reliable and diligent, this is an opportunity to increase your income . . . and have the freedom, financial independence, and prestige of YOUR OWN business.

These are full time dealerships . . . but you can start in spare time and have a profitable, lifetime business when your present job ends. A Duraclean dealer will train and assist you. He'll reveal his successful, proven methods and sales plans. He'll **work with you.**

Alert dealers can average $5 hourly gross profit on service they render plus $3 on EACH service-man at National Price Guide charges. This business is **easy** to learn . . . quickly established.

FREE ***Booklet tells how!***

You Become an Expert

in cleaning and protecting Rugs and Upholstery

DURACLEAN cleans by *absorption.* It eliminates scrubbing . . soaking . . shrinkage. Aerated foam, created by electric Foamovator, restores natural lubrication in rugs and upholstery. Dirt, grease and many unsightly spots vanish. Fabrics and floor coverings are cleaned with *a new consideration for their life and beauty.*

This modern process avoids strong soaps and machine scrubbing, thus eliminating unnecessary wear and breaking of fibers. Fabric life is increased.

DURACLEANING is done *in the home.* Customers like this convenience. Fabrics dry in a few hours. Rug pile again stands erect and even. Brilliant colors revive. Furnishings become clean, fresh and enlivened.

DURAPROOF is another year 'round service rendered in the home, office or institution — *without removing furnishings.* It protects upholstery, rugs, furs, clothing and auto interiors against damage by moths and carpet beetles. U. S. Government says **"Moths are present in practically every household . . No section of country seems free from such infestations." DURAPROOF** kills moths and carpet beetles . . it makes materials non-eatable to both. **DURAPROOF** is backed by an International Money Back, 4-Year Warranty.

Easy to Learn • No Overhead Expense

Permanent, Growing Market

Service is rendered **IN** homes, offices, hotels, theaters, institutions and to revive used-car upholstery for auto dealers. There is need for these services in almost every building. Duraclean dealers operate from their home, an office or shop, as they prefer. It's **easy to learn** . . . we quickly train you. Rendering service yourslf, at first, prepares you to train and supervise service men.

Repeat and Voluntary Orders

Demonstrations win new customers.

DURACLEAN Dealers find REPEAT and VOLUNTARY orders a major source of income. Customers, enthused with results, tell friends and neighbors. Furniture and department stores and others turn over rug and upholstery cleaning and mothproofing to **DURACLEAN** Dealers. We show you **27 ways** to get new customers.

We Help You Grow

Our **MUTUAL COOPERATION** program gives you many unique and continuous advantages: **National Advertising** in Life, McCalls, House & Garden, Maclean's (Canada) and a dozen others. **Copyright** and **trademark** protection. **Certificate** approves equipment and materials. **Products Insurance. Six-year Warranty. Pocket Demonstrators. Sales Book. Advertising Folders & Cards. Tested Ads. Ad Cuts & Mats. Store Display Cards. Radio & TV Musical Commercials.** Home Show **Booth Display. Publicity Program** gets FREE local newspaper stories. **Prizes. Laboratory** research and development. **Duragram** bulletins. **Resale Service. Annual Conventions.** Behind all this is a **25-year-old** headquarters interested in YOUR personal success. If you want to become the owner of a **DURACLEAN** Service business, you should inquire now, TODAY, while territory is still available.

What Dealers Say

W. Lookiebill: We've had 20 years of pleasant dealings. I'm 65 but am setting my sights for 20 more years.
Gerald Merriman: $700 cleaning..only 13 working days.
P. D. Freidinger: 70% of our business is repeat.
A. Ullman: Every demonstration has been a sale.
Ellsworth: Your advertising certainly has paid dividends.
M. Lassanske: My original investment was returned in about two months. I am not sorry in any way that I started my business 'on a shoe string.'
R. Kimbrough: Finished First White House of Confederacy and am to **Duraclean** the Governor's Mansion.
Margarette Turner: Took in $106 in 15 or 18 hours.
L. Johnson: Each customer leads to 3 or 4 more.
T. Komori: We have 1,000,000 yen contract Duracleaning for U. S. Army in Japan.

FREE Booklet

Our first letter and illustrated booklet will explain everything—the two modern, urgently needed services, waiting market, how business grows, your large profit, easy terms and PROTECTED territory.

25th ANNIVERSARY • DURACLEAN DEALERS OF AMERICA • 1930 • 1955

EASY TERMS

A moderate payment establishes **your own** business—pay balance from sales. We furnish electric machines, folders, store cards, introduction slips, sales book, demonstrators and **enough material to return your TOTAL investment.** Mail coupon **today!** No obligation.

Duraclean Co. 5-18D Duraclean Bldg. DEERFIELD, ILLINOIS

"OWN a Business" Coupon

DURACLEAN CO., 5-18D Duraclean Bldg., Deerfield, Illinois.

Without obligation to me, send booklet and letter giving full details. Tell me how I may OWN a growing business of my own built upon satisfied customers.

Name _____

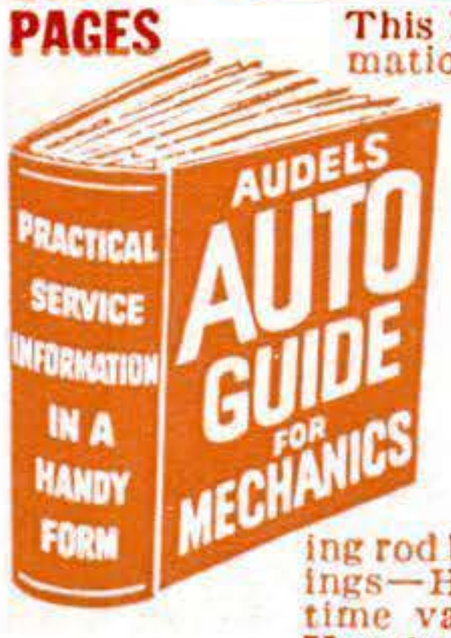
Address _____

City _____ State _____

Copyrighted material

WHAT ALL AUTO MECHANICS WANT TO KNOW

1664 PAGES



This Big Practical Book gives full information with working diagrams covering the principles, construction, ignition, service and repair of modern cars, trucks and buses.

Diesel Engines, Hydramatic & Fluid Drives Fully Explained.

A complete Guide of 1664 pages, with over 1500 illustrations showing inside views of working parts, with instructions for service jobs.

IT PAYS TO KNOW

How to fit pistons—How to locate engine knocks. How to fit connecting rod bearings—How to service main bearings—How to recondition valves—How to time valves—How to adjust fan belts—How to adjust carburetors and chokes. How to rebuild a clutch—How to service automatic transmissions—How to service brakes—How to adjust steering gear—How to cope with ignition troubles—How to service distributors—How to time ignition—How to "tune up" an engine.

$4 COMPLETE • PAY $1 A MO.
TO GET THIS ASSISTANCE FOR YOURSELF SIMPLY FILL IN AND MAIL COUPON TODAY.

Step up your own skill with the facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in a Handy Form. Fully illustrated and Easy to Understand. Highly Endorsed. Check the book you want for 7 DAYS FREE EXAMINATION. Send No Money. Nothing to pay postman.

MAIL ORDER

Check NOW!

You Can Look Over Any Guide In Your Own Home — Start the Easy Payments If Satisfied

MAIL THIS TODAY

AUDEL, Publishers, 49 W. 23 St., NEW YORK 10, N. Y.

Please send me postpaid for FREE EXAMINATION books marked (x) below. If I decide to keep them I agree to mail $1 in 7 Days on each book or set ordered and further mail $1 monthly on each book or set until I have paid price, otherwise I will return them.

- ☐ AUTOMOBILE MECHANICS GUIDE, 1664 Pages. $4
- ☐ TRUCK & TRACTOR GUIDE, 1299 Pages . . . 4
- ☐ DIESEL ENGINE MANUAL, 575 Pages 2
- ☐ MACHINISTS HANDY BOOK, 1650 Pages . . . 4
- ☐ WELDERS GUIDE, 400 Pages 1
- ☐ BLUE PRINT READING, 416 Pages 2
- ☐ MATHEMATICS & CALCULATIONS, 700 Pages. 2
- ☐ SHEET METAL PATTERN LAYOUTS, 1100 Pages 4
- ☐ SHEET METAL WORKERS HANDY BOOK, 388 Pgs. 1
- ☐ MECHANICAL DRAWING GUIDE, 160 Pages . . 1
- ☐ MECHANICAL DRAWING & DESIGN, 480 Pages 2
- ☐ AIRCRAFT WORKER, 240 Pages 1
- ☐ TELEVISION SERVICE MANUAL, 434 Pages . . 2
- ☐ RADIOMANS GUIDE, 1040 Pages 4
- ☐ ELECTRONIC DEVICES, 216 Pages 2
- ☐ ELECTRIC MOTOR GUIDE, 1000 Pages 4
- ☐ WIRING DIAGRAMS (Light & Power), 272 Pgs. 1
- ☐ ELECTRICIANS EXAMINATIONS, 250 Pages . . 1
- ☐ ELECTRIC POWER CALCULATIONS, 425 Pages. 2
- ☐ HANDY BOOK OF ELECTRICITY, 1440 Pages. . 4
- ☐ ELECTRIC DICTIONARY, 9000 Terms 2
- ☐ ELECTRIC LIBRARY, 7000 Pages (12 Book Set) 18
- ☐ SHIPFITTERS HANDY BOOK, 250 Pages . . . 1
- ☐ REFRIGERATION & Air Conditioning, 1280 Pgs. 4
- ☐ MILLWRIGHTS & MECHANICS GUIDE, 1200 Pgs. 4
- ☐ POWER PLANT ENGINEERS GUIDE, 1500 Pages 4
- ☐ ENGINEERS & FIREMANS EXAMS, 525 Pages . 1
- ☐ PUMPS, Hydraulics & Air Compressors, 1658 Pgs. 4
- ☐ OPERATING ENGINEERS LIBRARY (3 Books) . 9
- ☐ MECHANICAL DICTIONARY, 950 Pages 4
- ☐ GARDENERS & GROWERS GUIDES (4 Book Set) 6
- ☐ CARPENTERS & BUILDERS GUIDES (4 Book Set) 6
- ☐ PLUMBERS & Steamfitters Guides (4 Book Set) 6
- ☐ MASONS AND BUILDERS GUIDES (4 Book Set) 6
- ☐ PAINTERS & DECORATORS MANUAL, 450 Pgs. 2
- ☐ HOUSE HEATING GUIDE, 1000 Pages 4
- ☐ OIL BURNER GUIDE, 384 Pages 1
- ☐ HOME APPLIANCE SERVICE GUIDE, 800 Pages 4

Name _____

Address _____

Occupation _____

Employed by _____ S12

"My selling time actually shows me a profit of $20 TO $25 AN HOUR"

with Science's New Midget Miracle, the PRESTO Fire Extinguisher

M. R. STANLEY

says M. R. Stanley of Montana. Many others "cleaning up"—so can YOU!

THIS is an amazing **new kind** of fire extinguisher. Tiny "Presto" (about the size of a flashlight) does job of bulky extinguishers that cost 4 times as much, and are 8 times as heavy. Ends fires fast as 2 seconds. Fits in palm of hand. Never corrodes. **Guaranteed for 20 years!** Sells for only $3.98! Over two million already sold!

Show it to civil defense workers, owners of homes, cars, boats, farms, etc., and to stores for re-sale. Make good income. C. S. Melious made $175 in just first 5 days. C. Kama, $1,000 a month. Write for FREE Sales Kit. No obligation.

(If you want a regular Presto to use as a demonstrator, send $2.50. Money back if you wish.)

Science's New Midget Miracle—"PRESTO"

MERLITE INDUSTRIES, Dept. 16-C, Presto Div., 114 East 32nd St., New York 16, N. Y.

(In Canada: Mopa Co., Ltd., 371 Dowd St., Montreal 1, P. Q.)

LAW FREE BOOK

THE LAW TRAINED MAN

Write today for a FREE copy of illustrated law book, **"THE LAW-TRAINED MAN,"** which shows how to earn the professional Bachelor of Laws (LL.B.) degree through home study of the famous Blackstone Law Course. All necessary books and lessons provided. Moderate cost; convenient monthly terms. Write for FREE law training book today.

Blackstone School of Law, 225 N. Michigan Ave.
Founded 1890 **Dept. 129, Chicago 1, Ill.**

Speak Another LANGUAGE tomorrow!

FRENCH - SPANISH GERMAN ITALIAN by LINGUAPHONE

34 LANGUAGES available for

10 DAY FREE TRIAL

TRY, DON'T BUY! AT HOME, LISTEN—LEARN—SPEAK Conversational French, Spanish, German, Japanese—your choice of 34 languages—**or it costs you nothing!**

Only Linguaphone brings the world's best native language teachers into your home on fine life-like recordings. You learn easily, quickly, naturally!

That's why Linguaphone is used 'round the world by educators, governments and business firms. More than a million home-study students of all ages.

10 DAY FREE TRIAL

Send today for Free booklet that tells about Linguaphone and how you may obtain a COMPLETE Course-unit in the language you choose on 10-day FREE TRIAL

LINGUAPHONE INSTITUTE, T-147-125 Radio City, N.Y. 20
Please send me your FREE Book on Linguaphone plus details of 10 DAY FREE TRIAL. No obligation, of course.
Language interest . . . . . .
Name . . . . . .
Address . . . . . .
City . . . . . Zone . . . . . State . . . . . .
Over Half a Century of Leadership in Modern Language Courses

Copyrighted material

You Practice SERVICING with Kits I Send You

Nothing takes the place of PRACTICAL EXPERIENCE. That's why NRI training is based on LEARNING BY DOING. You use parts I send to build many circuits common to Radio and Television. With my Servicing Course you build the modern Radio shown at left. You build a Multitester and use it to help make $10, $15 a week fixing sets in spare time while training. All equipment is yours to keep. Coupon below will bring book of important facts. It shows other equipment you build.

You Practice BROADCASTING with Kits I Send You

As part of my Communications Course I send you parts to build low-power Broadcasting Transmitter at left. Use it to get practical experience. You put this station "on the air" . . . perform procedures demanded of broadcasting station operators. An FCC Commercial Operator's License can be your ticket to a bright future. My Communications Course trains you to get your license. Mail coupon. Book shows other equipment you build for practical experience.

I Will Train You at Home in Spare Time to be a RADIO-TELEVISION Technician

TELEVISION

Making Jobs, Prosperity

25 million homes have Television sets now. Thousands more sold every week. Trained men needed to make, install, service TV sets. About 200 television stations on the air. Hundreds more being built. Good job opportunities here for qualified technicians, operators, etc.

J. E. SMITH, President
National Radio Institute
Washington, D. C.
Our 40th Year

America's Fast Growing Industry Offers You Good Pay, Success

Training PLUS opportunity is the PERFECT COMBINATION for job security, advancement. When times are good, the trained man makes the BETTER PAY, gets PROMOTED. When jobs are scarce, the trained man enjoys GREATER SECURITY. NRI training can help assure you and your family more of the better things of life. Radio is bigger than ever with over 3,000 broadcasting stations and more than 115 MILLION sets in use, and Television is moving ahead fast.

N.R.I. Training Leads to Good Jobs Like These

I TRAINED THESE MEN

"I have progressed very rapidly. My present position is Studio Supervisor with KEDD Television, Wichita."—Elmer Frewaldt, 3026 Stadium, Wichita, Kans.

"Fix sets part time in my shop. Made about $500 first three months of the year. Could have more but this is about all I can handle."—Frank Borer, Lorain, Ohio.

"I've come a long way in Radio and Television since graduating. Have my own business on Main Street."—Joe Travers, Asbury Park, New Jersey.

"I didn't know a thing about Radio. Now have a good job as Studio Engineer at KMMJ."—Bill Delzell, Central City, Nebraska.

BROADCASTING: Chief Technician, Chief Operator, Power Monitor, Recording Operator, Remote Control Operator. SERVICING: Home and Auto Radios, Television Receivers, FM Radios, P.A. Systems. IN RADIO PLANTS: Design Assistant, Technician, Tester, Serviceman, Service Manager. SHIP AND HARBOR RADIO: Chief Operator, Radio-Telephone Operator. GOVERNMENT RADIO: Operator in Army, Navy, Marine Corps, Forestry Service Dispatcher, Airways Radio Operator. AVIATION RADIO: Transmitter Technician, Receiver Technician, Airport Transmitter Operator. TELEVISION: Pick-up Operator, Television Technician, Remote Control Operator.

Start Soon to Make $10, $15 a Week Extra Fixing Sets

My training is practical, complete; is backed by 40 years of success training men at home. My well-illustrated lessons give you basic principles you need and my skillfully developed kits of parts "bring to life" things you learn from the lessons. I start sending you special booklets the day you enroll, that show you how to fix sets. Multitester you build with my parts helps you discover and correct set troubles, helps you make money fixing neighbors' sets in spare time while training. Many make $10, $15 a week extra this way.

Mail Coupon — Find Out What Radio-Television Offer You

Act now to get more of the good things of life. I send actual lesson to prove NRI home training is practical, thorough. My 64-page book "How to be a Success in Radio-Television" shows what my graduates are doing and earning. It gives important facts about your opportunities in Radio-Television. Take NRI training for as little as $5 a month. Many graduates make more than the total cost of my training in two weeks. Mail coupon now to: J. E. SMITH, President, Dept. 5NB, National Radio Institute, Washington 9, D. C. Our 40th year.

AVAILABLE to all qualified VETERANS UNDER G.I. BILLS

Good for Both-FREE

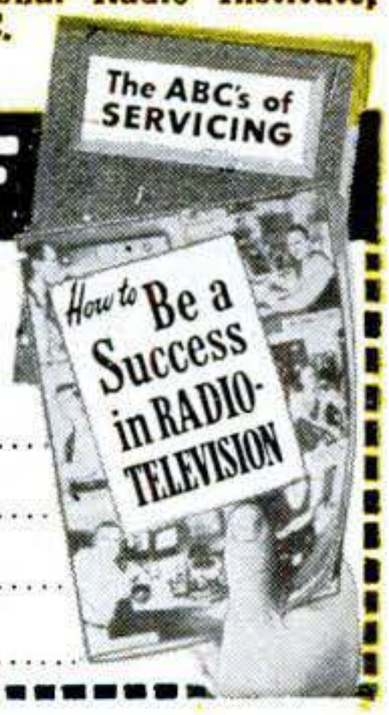
MR. J. E. SMITH, President, Dept. 5NB
National Radio Institute, Washington 9, D. C.
Mail me Sample Lesson and 64-page Book, FREE.
(No salesman will call. Please write plainly.)

Name.....Age.....

Address.....

City.....Zone....State.....

VETS write in date of discharge .....



Mail Today-Tested Way to Better Pay

Copyrighted material

YOU can own and play a famous make Italian

ACCORDION

Buy Direct—Save 50%

No Risk Plan . . .

5 DAYS FREE TRIAL

There's a whole new world of pleasure, satisfaction and popularity waiting for you the day you start playing your accordion. It's easy to learn and it costs so little to own and play a fine Italian Accordion under our famous No Risk Plan. Play simple tunes with few minutes practice. You select the accordion you want from dozens of smart new models . . . and we'll send it to you on FIVE DAYS FREE TRIAL. We are direct factory importers and distributors . . . and because of our huge volume and great buying advantages, actually SAVE YOU UP TO 50% AND MORE OFF REGULAR PRICES. You may have long terms with a low down payment. Trade-ins accepted. Complete Home Study Course included FREE with every instrument. Lifetime guarantee!

Low Down Payment—Easy Terms

It pays to deal direct with an accordion *specialist!* Our buyers travel regularly to Italy where the finest accordions in the world are made. We select only the most outstanding instruments and, each accordion is tested and carefully retuned in our own shops before shipment to you. We invite you to Mail Coupon below for big new color catalog of accordions and facts about this exciting instrument . . . plus lowest wholesale prices . . . ALL FREE. No obligation. Write today.

ACCORDION MANUFACTURERS AND WHOLESALERS OUTLET
DEPT. P-125, 2003 W. CHICAGO AVE., CHICAGO 22, ILL.

Mail Coupon Today!

Accordion Manufacturers and Wholesalers Outlet, Dept P-125, 2003 W. Chicago Ave., Chicago 22, Ill.
Please rush Color Catalog of newest Italian Accordions and low wholesale prices.

Name _____
Address _____
City _____ Zone ____ State ____

FREE! BIG COLOR CATALOG and new Low Wholesale Prices

BUILD IT YOURSELF

MODEL BR-2

$17.50 (Less Cabinet)

SHPG. WT. 10 LBS.

Heathkit
BROADCAST BAND
RECEIVER KIT

Have you ever experienced the thrill of building your own radio? Invest a few of your dollars—a few hours of your time, and build a truly worthwhile broadcast band receiver. Transformer operation eliminates potential shock hazard characteristic of "economy" AC-DC sets. Operates as radio, phono, amplifier, or tuner. Fine tone quality, excellent sensitivity. Simplified Construction Manual outlines basic theory of radio principles. Actually a radio course in itself. Price includes tubes—speaker—chassis, etc. Every part you need! Order your Heathkit Radio Kit today.

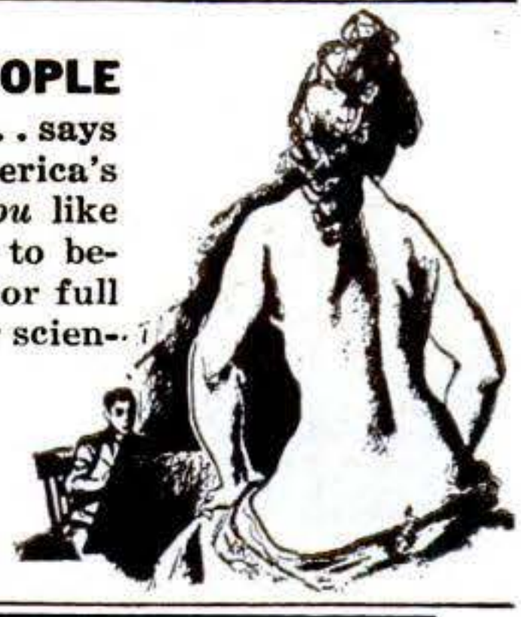
OTHER "BUILD IT YOURSELF" *Heathkits*

- Oscilloscope
- Vacuum Tube Voltmeter
- Signal Generator
- Amateur Transmitter
- Communications Receiver
- Multimeter
- Handitester
- Hi-Fi Amplifier
- Hi-Fi Preamplifier
- Battery Eliminator
- Signal Tracer
- Tube Checker
- *(and over 50 others)*

WRITE FOR FREE CATALOG

HEATH COMPANY
A Subsidiary of Daystrom, Inc.
BENTON HARBOR 16, MICH.

"WE'RE LOOKING FOR PEOPLE WHO LIKE TO DRAW" . . . says Norman Rockwell, one of America's 12 Most Famous Artists. If *you* like to draw, you may have talent to become a successful artist, spare or full time. Find out for sure with our scientific, 8-page **Free Art Talent Test.** Thousands paid $1 to take it. Get it FREE. No obligation. Send your name, address, age to: Famous Artists Schools, Dept. 11-Z, Westport, Conn.



HANDS TIED?

—because you lack a HIGH SCHOOL DIPLOMA

• You can qualify for an American School Diploma *in spare time at home!* If you have left school, write or mail coupon for FREE booklet that tells how. No obligation of any kind.

OUR 58TH YEAR

AMERICAN SCHOOL, Dept. V946
Drexel at 58th, Chicago 37, Illinois

Please send FREE High School booklet.

Name .....
Address .....
City & State .....

Canadian Residents: Complete Canadian Course Available. Write American School, 1610 Sherbrooke St. West, Montreal.

Copyrighted material

Learn at Home IN YOUR SPARE TIME to Fix Electrical Appliances

To build a better future, get into a field where there's much important work and the security that comes from knowing a good trade. Servicing electrical appliances offers that OPPORTUNITY. Every wired home has an average of 8 electrical appliances. Up to 10 million new appliances are sold every year and owners pay well to keep them in repair. That's making a fast-growing need for trained men.

Start Soon to Earn $3, $4, $5, an Hour Extra in Your Spare Time

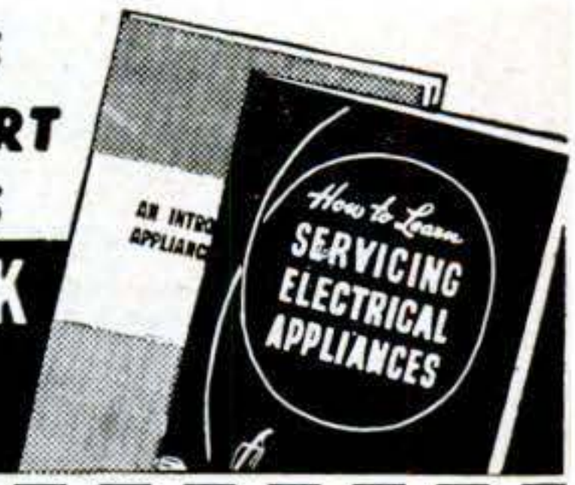
Start soon to fix electric toasters, clocks, fans, vacuum cleaners and other appliances for neighbors and friends. Work in your basement, garage or spare room. Pick up $3 to $5 an Hour *extra that way*. It's easy to increase your earning power—to pay for this training many times over with your spare time earnings.

Learn and Earn with Multi-Use Tester Built with Parts We Send

This course includes the parts to build a portable, sturdy Appliance Tester that helps you locate electrical defects quickly and easily. You use it to learn and do actual electrical appliance repair jobs. If you want better pay learn this good trade. No need to give up your present job. You can train at home in your spare time for only $2.50 down and $5.00 a month. A small price to pay for increased earnings, a more secure future. Paste coupon below on a 2c postal or mail in envelope for free book and sample lesson. Address National Radio Institute, Dept. BN5, Washington 9, D.C.

2c TO MAIL THIS COUPON MAY START YOU TO SUCCESS

LESSON AND BOOK FREE



NATIONAL RADIO INSTITUTE
Dept. BN5, Washington 9, D. C.
Please send me Electric Appliance Training lesson and book free. (No salesman will call.)

Name.....Age.....

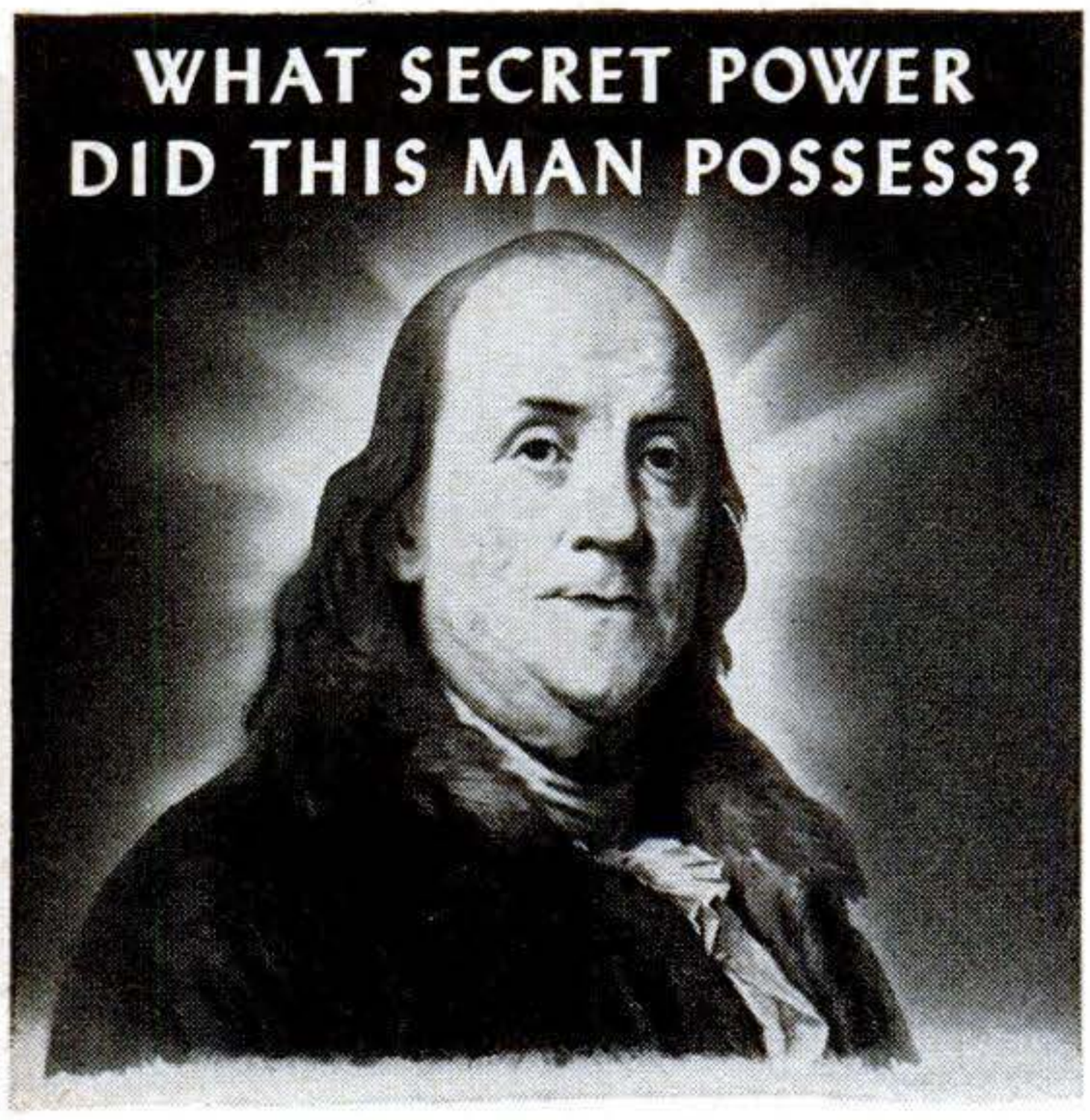
Address.....

City.....Zone.....State.....

APPROVED MEMBER NATIONAL HOME STUDY COUNCIL

Copyrighted material

WHAT SECRET POWER DID THIS MAN POSSESS?



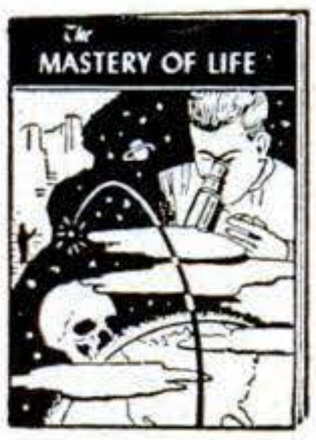
BENJAMIN FRANKLIN
(A Rosicrucian)

WHY was this man great? How does anyone —man or woman—achieve greatness? Is it not by mastery of the powers within ourselves?

Know the mysterious world within you! Attune yourself to the wisdom of the ages! Grasp the inner power of your mind! Learn the secrets of a full and peaceful life!

Benjamin Franklin—like many other learned and great men and women—was a Rosicrucian. The Rosicrucians (NOT a religious organization) first came to America in 1694. Today, headquarters of the Rosicrucians send over seven million pieces of mail annually to all parts of the world. Write for YOUR FREE COPY of "The Mastery of Life"—TODAY. No obligation. No salesmen. A non-profit organization. Address: Scribe P.S.B.

THIS BOOK FREE!



The ROSICRUCIANS
SAN JOSE • (AMORC) • CALIFORNIA

SEND THIS COUPON

Scribe P.S.B.
The ROSICRUCIANS (AMORC)
San Jose, California

Please send me the *free* book, *The Mastery of Life*, which explains how I may learn to use my faculties and powers of mind.

Name_____

Address_____

City_____

HEARING BAD?

If so, you will be happy to know how we have improved the hearing and relieved those miserable head noises, caused by catarrh of the head, for thousands of people (many past 70) who have used our simple Elmo Palliative Home Treatment in the past 16 years. This may be the answer to your prayer. NOTHING TO WEAR. Here are SOME of the symptoms that may likely be causing your catarrhal deafness and head noises: Head feels stopped up from mucus. Dropping of mucus in throat. Hawking and spitting. Mucus in nose or throat every day. Hearing worse with a cold. Hear — but don't understand words. Hear better on clear days. Worse on rainy days. Head noises like crickets, bells, whistles, clicking, escaping steam or many other sounds. If your condition is caused by catarrh of the head, you, too, may likely enjoy such wonderful relief as many others have reported. WRITE TODAY FOR PROOF AND 30 DAY TRIAL OFFER.

THE ELMO COMPANY
DEPT. 6PS9 DAVENPORT, IOWA

60 POWER TELESCOPE $3.98

VARIABLE EYEPIECE 20X-40X-60X—BRASS BOUND

NEW! Three telescopes in one. 3 different magnifications. 20 power for ultra-bright images with 40 and 60 power for extra long range. Guaranteed to bring distant objects, people, sports events, ships, moon, stars, etc. 60 times as close. Made in U.S.A.

Most powerful for anywhere near the money. 5 Sections. Closes to 1 ft. long. Contains 4 ground and polished lenses. Also used as a powerful compound microscope. Directions included. Mass production enables us to offer this instrument at amazing price of $3.98 complete. Money back guarantee. We pay postage. Get yours now.

As A Microscope

CRITERION CO. **331 CHURCH ST.**
DEPT. PSB31 **HARTFORD 1, CONN.**

ENGINEERING DEGREE IN 27 MONTHS

BIG DEMAND FOR GRADUATES

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL and ELECTRONIC ENGINEERING (Inc. Radio and TV)

Hundreds of young men are earning **B.S. ENGINEERING DEGREES** annually in this recognized institution—year around operation. New terms start quarterly. Many students earn a major part of their college expenses in this large industrial center.

Low tuition. Competent instruction. Thorough, intense, practical program. Modern, well-equipped laboratories including new physics laboratory and modern wind tunnel. Individualized instruction emphasized.

Government approved for G.I.'s. Engineering preparatory courses. Students from 48 states and 21 foreign countries. Enter December, March, June, Sept. Send coupon for free catalog and full information. Enroll now.

INDIANA TECHNICAL COLLEGE

6125 E. Washington Boulevard, Fort Wayne 2, Indiana

Please send me free information on B. S. Engineering degree in 27 months as checked.

☐ Aeronautical ☐ Chemical ☐ Civil
☐ Electrical ☐ Mechanical ☐ Electronics

Name.....

Address.....

Copyrighted material

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

52-M DISTRICT NATIONAL BUILDING

WASHINGTON 5, D. C.

Copyrighted material

Letters—

Nothing's Safe in A-War

I'm one of the "45,000 people living within five miles" of the atomic power plant they're building for New York City [Aug., p. 82], so I was interested in your remarks about its safety. You said it can't blow up. But suppose somebody blows it up? Mightn't an enemy bombing attack shower the landscape with murderously hot water, uranium, thorium and who-knows-what?

SIDNEY ERSKEN, Peekskill, N.Y.

Old-fashioned high-explosive bombs aren't likely to cause much harm, since the furnace building is reasonably bombproof. If an A- or H-bomb hit, the bomb itself would spew so much radiation that the small extra amount from the destroyed power reactor would hardly be noticeable.

That $1,300 Helicopter

Where can I get that $1,300 helicopter pictured in your September issue [p. 169]?

P. R. GRAHAM, Mt. Clare, W. Va.

It's an experimental model designed in Italy and not yet—unfortunately, to judge from the many inquiries we received—in production.

6 Volts From 12?

Glen Connor's extra battery for operating a 6-volt radio on a 12-volt car system [PSM, Oct., p. 193] is expensive and unnecessary. A direct hookup to three of the six battery cells works fine in my car.

J. C. GRADY, Kenly, N.C.

I use a 6-volt radio on my 12-volt car system by putting a 10-ohm, 50-watt resistor in series with it.

ROBERT D. BURK, Dayton

You can get 6 volts from a 12-volt car battery without spending a cent. Drill a hole

Leo Kerber, Shakopee, Minn. "Awhile ago I tried for one of these scholarships. I didn't think my sketch could win, but it did! I've learned a lot from the art course—and have already sold quite a bit of my work."

DRAW ME!

TRY FOR A FREE 2-YEAR ART SCHOLARSHIP WORTH $335.00

Prize: Two years of free training for career in advertising art or illustrating—plus a series of art textbooks and a professional drawing outfit!

Scholarship is offered by a famous home study art school—world's largest. Many of its graduates are earning real money, today, in the art field. You're trained by professional artists. You get individual coaching, guidance. Mail your drawing today!

DRAW THIS GIRL'S HEAD

5 inches high. Use pencil only. All drawings must be received by Jan. 31, 1956. None returned. Winner notified. Amateurs only. Our students not eligible.

ART INSTRUCTION, INC.
STUDIO 12145—500 S. 4th Street
Minneapolis 15, Minnesota

Please enter my attached drawing in your January contest.

(PLEASE PRINT)

Name_____ AGE_____

Address_____ City_____

Zone____ County_____ State_____

Occupation_____ Phone_____

12145

Copyrighted material

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS • COPYRIGHTS • PATENTS

142-M VICTOR BUILDING, WASHINGTON 1, D. C.

Copyrighted material

LET CAR EXPERTS

GUIDE YOUR HANDS THROUGH ANY AUTO REPAIR

QUICKLY-- EASILY--RIGHT!

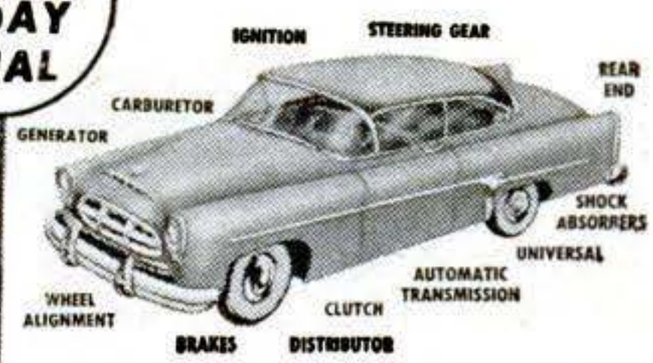
FREE 7-DAY TRIAL

Covers 737 Models —1940 thru 1955

All These Makes

Buick, Cadillac, Chevrolet, Chrysler, Crosley, De Soto, Dodge, Ford, Frazer, Henry J, Hudson, Kaiser, Lincoln, Mercury, Nash, Oldsmobile, Packard, Plymouth, Pontiac, Studebaker, Willys

2,000,000 Copies Sold!



SUPPOSE you had an automobile factory engineer standing right beside you . . . guiding your hands through every step of even the toughest car repair jobs! Think how you'd "whiz through" every job! No wonder, then, 2,000,000 MOTOR'S Auto Manuals have been sold. No wonder so many thousands of beginners and expert mechanics alike are *already* using MOTOR'S brand-new AUTO REPAIR MANUAL. It shows you, *in step-by-step words and pictures*, factory-approved repair procedures for fixing ANY part of ANY car, 1940 through 1955!

No guesswork! MOTOR'S Manual "starts from scratch" — leads you through entire job with easy step-by-step directions, clear "how-to" pictures. Tells WHERE to start, what TOOLS to use, how to remove, repair and replace parts. You CAN'T go wrong.

1000 Big ILLUSTRATED Pages

NEW, REVISED, ENLARGED Edition contains the "meat" from over 160 OFFICIAL shop manuals—simplified for YOU in Over 1,000 big pages. 23,436 essential repair specifications on 737 chassis car models. More than 2,900 "this-is-how" pictures. 225,000 service and repair facts. Leads beginners every step of the way. Time-saving factory repair procedures for experts. Used by U. S. Army and Navy.

Try Book FREE 7 Days

SEND NO MONEY! Pay postman nothing. Make Manual PROVE to you what it's got. Unless you agree this is the greatest time and work saver you've ever seen —return book in 7 days and pay nothing. Mail coupon today to: MOTOR Book Dept., Desk 212, 250 W. 55th St., New York 19, N.Y.

Same FREE Offer On MOTOR'S New Truck Repair Manual

Covers EVERY job on EVERY popular make gasoline and Diesel truck made from 1946 thru 1955. FREE 7-Day Trial. Check proper box in coupon.

MAIL COUPON NOW FOR 7-DAY FREE TRIAL

MOTOR BOOK DEPT.
Desk 212, 250 W. 55th St., New York 19, N. Y.
Rush to me at once (check box opposite book you want):

☐ MOTOR'S *New* AUTO REPAIR MANUAL. If O.K., I will remit $2 in 7 days. $2 monthly for 2 months and a final payment of 95¢ (plus 35¢ delivery charges) one month after that. Otherwise I will return the book postpaid in 7 days. *(Foreign price, remit $9 in cash with order.)*

☐ MOTOR'S *New* TRUCK REPAIR MANUAL. If O.K., I will remit $2 in 7 days, and $2 monthly for 3 months, plus 35¢ delivery charges with final payment. Otherwise I will return books postpaid in 7 days. *(Foreign price, remit $10 cash with order.)*

Print Name..... Age.....

Address.....

City..... State.....

☐ Check box and save 35¢ delivery charge by enclosing WITH coupon entire payment of $6.95 for Auto Repair Manual (or $8 for Truck Repair Manual.) Same return-refund privilege.

in the middle strap and insert a self-tapping screw. I did this to get juice for a 6-volt fan and it works fine.

J. FOSTER BAILEY, Baltimore

Several readers have suggested these two methods. Some overlook the fact that the two-way radio specified in the article, having a transmitter, takes far more current than the ordinary car radio.

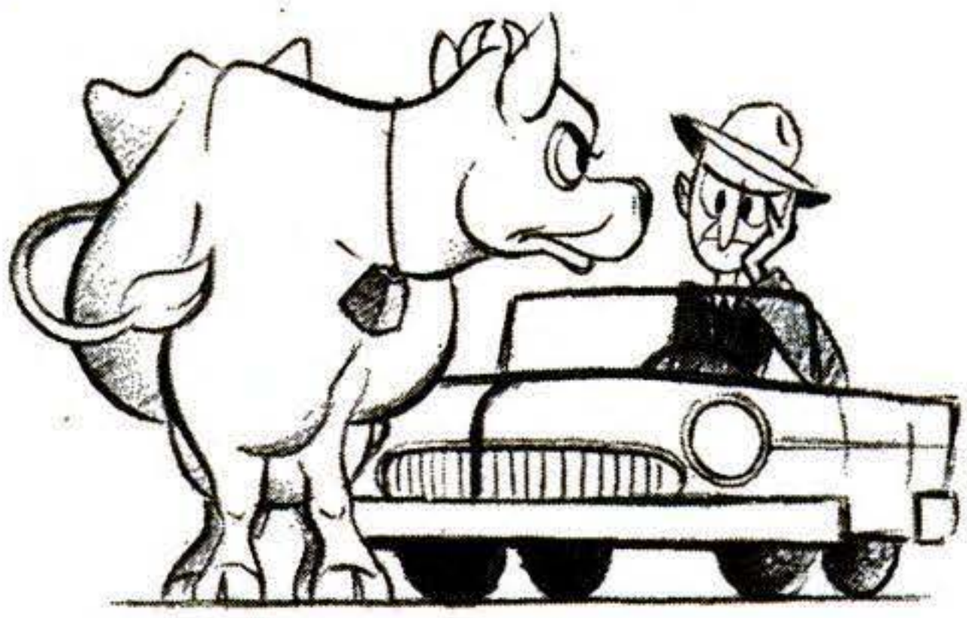
Most of today's 12-volt batteries have internal straps, which cannot be tapped. Where tapping off 6 volts is feasible, it may serve for such light accessories as fans. But according to Chrysler engineers, experiments show that drawing any considerable current from half the cells creates an unbalanced condition that can be very harmful to the battery.

A voltage-dropping resistor is a current waster, dissipating energy as heat. In reducing 12 volts to 6, half the current used is thrown away. This may be unimportant in running a fan, but serious with heavy equipment. A resistor also introduces poor voltage regulation, which is especially detrimental in a transmitting rig.

To Honk or Not to . . .

I agree with Mr. Winstead in your October letters column: Horn blowing startles many a pedestrian into doing the wrong thing. A sudden blast may easily confuse him into jumping out of the path of one car into the path of another.

Horns frighten animals into doing the same thing. Yet if a cow (cattle have the right of way the same as trains) happens



to be in your way, you can blow your battery down and it won't do any good if she takes a notion not to move.

ALICE GOODENOW, Eloise, Mich.

I'm for keeping horns.

A pedestrian once walked into the side of my car while reading a paper held in front of his face. Fortunately, he was not injured. I should have touched the horn button but

Copyrighted material

Train in Big Coyne Shops

GREAT OPPORTUNITY FIELDS!

Instructor helping students check the wiring and trace the circuits of television receivers

This big fire-proof building is occupied entirely by Coyne

Instructor explaining operation and testing of a large Motor Generator.

YOUNG MEN AND OLDER MEN— PREPARE FOR A CAREER WITH A FUTURE!

Conditions are changing. Many "one operation" jobs will not last. ***Don't be satisfied with a "no future" job.*** Whether 17 or up to 45 years of age, train the Coyne way for a better job and a real future in ELECTRICITY or TELEVISION-RADIO, ***fields that offer a world of opportunities.***

LARGEST, OLDEST, BEST EQUIPPED SCHOOL OF ITS KIND IN THE U.S.

TELEVISION-RADIO

Here at COYNE you're trained for Television, Testing, Trouble-Shooting on Radio, Public Address, F. M. Sound Units, etc. Many **Coyne** trained men in good jobs or own well paying Television-Radio businesses of their own.

ELECTRICITY

Big future in Power Plant Work, Motors, Industrial Electronics, Armature Winding, Home and Factory Wiring, Appliances, Refrigeration, Maintenance, Illumination, etc. Lifetime job service to **Coyne** graduates.

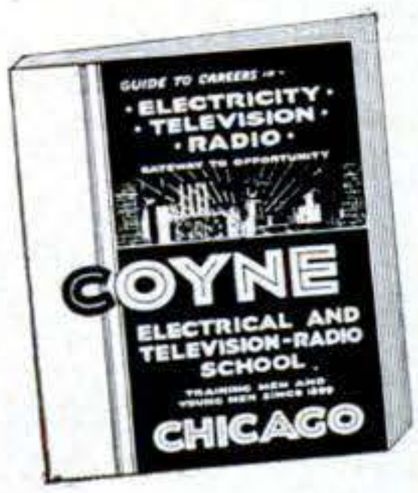
WE TRAIN YOU IN CHICAGO

Our famous Practical-Technical method gives you practical experience on a massive outlay of equipment. Actual shop work plus necessary technical training. You are trained right here in the great **Coyne** shops. Send for BIG FREE BOOK.

APPROVED FOR VETERANS

START NOW—PAY LATER

Enroll now, pay most of tuition after graduation. **Special plan for men of draft age.** We'll help you get part-time work, if you need it to help pay living costs while at Coyne.



Mail Coupon for Big FREE Book!

Whether you prefer Television-Radio or Electricity, train on actual equipment at **Coyne.** We will send you a Big, fully Illustrated Book *"Guide To Careers in Electricity and Television-Radio"*. **No salesman will call.** Mail coupon TODAY.

B. W. COOKE, President **COYNE** ELECTRICAL SCHOOL FOUNDED 1899

A TECHNICAL TRADE INSTITUTE OPERATED NOT FOR PROFIT
500 S. PAULINA STREET, CHICAGO, Dept. 95-73H
ELECTRICITY ★ RADIO ★ TELEVISION ★ REFRIGERATION ★ ELECTRONICS

B. W. Cooke, President
COYNE ELECTRICAL SCHOOL 500 S. Paulina
Dept, 95-73H, Chicago 12, Ill.

Send me your **Big Free** book. I am interested in field checked below. This does not obligate me.

☐ TELEVISION-RADIO ☐ ELECTRICITY

NAME.....

ADDRESS.....

CITY.....STATE.....

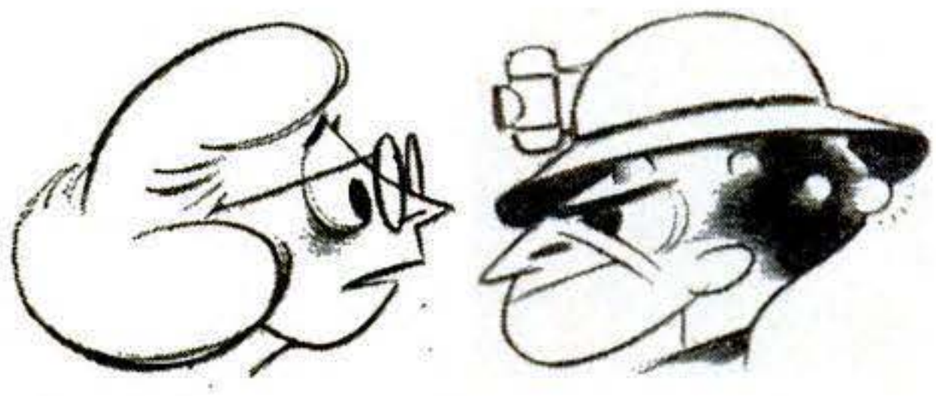
Copyrighted material

never dreamed he would continue right across the highway from the sidewalk without looking.

W. B. Spears, Ecorse, Mich.

Cars Give Him a Headache

Seat belts and dashboard padding are fine things, but I wish the Detroit wizards would turn their genius to a more homely kind of safety and protect my old skull from those mole tunnels they laughingly call doors. I long ago gave up wearing a hat in the car, since it got knocked into the gutter every



time I climbed in. But I may go back to wearing one again—a miner's safety helmet.

Dick O'Hara, Des Moines

Car Trunks Have Drains, But . . .

Most cars already have the trunk drainage vents that Donald Lovelady asked for in "I'd Like to See Them Make" [Aug., p. 113]. There is a rubber plug that pulls out so you can wash and drain the trunk.

Cpl. T. A. Cook, Ft. Ord, Calif.

Those little holes in the spare-tire pit make a trunk-cleaning job possible but not easy. You have to remove the tire, remove the plugs, and then swish furiously to get the water into the pit.

Where Does Space Begin?

At 200 to 300 miles above the earth, you say, our projected artificial satellite will travel "in the vacuumlike region of true space" [Sept., p. 130]. Just what is "true space" and how far from earth does it begin?

K. H. Howard, Cambridge, Mass.

"Space-equivalent" conditions, says Dr. H. Strugold, USAF space-medicine expert, are encountered with respect to lack of oxygen at 52,000 feet; boiling of body fluid at 65,000 feet; heavy cosmic radiation at 120,000 feet; ultraviolet solar radiation at 135,000 feet, appearance of black sky at 400,000 feet; meteorites at 500,000 feet, or about 95 miles, which may be considered just about the top of this "stairway to space."

New greaseless way to keep your hair neat all day

Prevents dry, unruly "musk-ox hair"

New Vitalis keeps hair in place and prevents dryness with V-7, the *greaseless* grooming discovery.

You never have an over-slick, plastered-down look. Try it. You'll *like* it.

ANOTHER FINE PRODUCT OF BRISTOL-MYERS

New VITALIS® Hair Tonic with V-7®

Copyrighted material

How to CRACK the education barrier

Is there an "education barrier" between you and promotion? Are young college graduates being brought in to fill positions above you?

You can break down that barrier . . . gain real security, responsibility, prestige . . . *surprise fellow employees and win their respect.* You can match yourself against the smartest of the college boys and come out a WINNER. Here's how!

AN HOUR A DAY THE I.C.S. WAY!

If you can spare an hour a day, if you have the determination to make good, if you're willing to invest pennies now for dollars later on—then I.C.S. can help you. You can be a man or woman, young or old, skilled or unskilled. So long as you can understand simple language and illustrated training manuals, you need have no doubts. The I.C.S. hour-a-day plan is SUCCESS-PROVED. You learn while you earn—anywhere, any time.

Just pick the subject you want!

Only I.C.S. offers you such a wide range of subjects to choose from. Drafting. Engineering. Television. Aeronautics. Business. High School. 277 courses in all. *I.C.S. is the oldest, largest home-study school. It is also the best known in business and industry.*

Free catalog plus free books!

When you mail the coupon below, you get a complete catalog on the subject you check with information about employment opportunities, training requirements, etc. And you get "How to Succeed"—36 pages of valuable tips on winning recognition, pay raises, success. Also, a free sample lesson in basic mathematics.

For Real Job Security—Get an I. C. S. Diploma! **I. C. S., Scranton 9, Penna.** Member, National Home Study Council

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS

BOX 62314M, SCRANTON 9, PENNA. (Partial list of 277 courses)

Without cost or obligation, send me "HOW to SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

ARCHITECTURE and BUILDING CONSTRUCTION
- ☐ Air Conditioning—Refrig.
- ☐ Architecture
- ☐ Architectural Interior
- ☐ Building Contractor
- ☐ Building Maintenance
- ☐ Carpenter and Mill Work
- ☐ Estimating
- ☐ Heating
- ☐ Painting Contractor
- ☐ Plumbing
- ☐ Reading Arch. Blueprints

ART
- ☐ Cartooning
- ☐ Commercial Art
- ☐ Fashion Illustrating
- ☐ Magazine Illustrating
- ☐ Show Card and Sign Lettering
- ☐ Sketching and Painting

AUTOMOTIVE
- ☐ Auto Body Rebuilding
- ☐ Auto Elec. Technician
- ☐ Auto-Engine Tune Up
- ☐ Automobile

AVIATION
- ☐ Aeronautical Engineering Jr.
- ☐ Aircraft & Engine Mechanic

BUSINESS
- ☐ Advertising
- ☐ Bookkeeping and Accounting
- ☐ Business Administration
- ☐ Business Correspondence
- ☐ Public Accounting
- ☐ Creative Salesmanship
- ☐ Federal Tax
- ☐ Letter-writing Improvement
- ☐ Office Management
- ☐ Professional Secretary
- ☐ Retail Business Management
- ☐ Sales Management
- ☐ Stenographic-Secretarial
- ☐ Traffic Management

CHEMISTRY
- ☐ Analytical Chemistry
- ☐ Chemical Engineering
- ☐ Chem. Lab. Technician
- ☐ General Chemistry
- ☐ Natural Gas Prod. & Trans.
- ☐ Petroleum Engineering
- ☐ Plastics
- ☐ Pulp and Paper Making

CIVIL, STRUCTURAL ENGINEERING
- ☐ Civil Engineering
- ☐ Construction Engineering
- ☐ Highway Engineering
- ☐ Reading Struct. Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Engineering
- ☐ Surveying and Mapping

DRAFTING
- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Mine Surveying and Mapping
- ☐ Plumbing Drawing and Estimating
- ☐ Structural Drafting

ELECTRICAL
- ☐ Electrical Engineering
- ☐ Electrical Maintenance
- ☐ Electrician ☐ Contracting
- ☐ Lineman

HIGH SCHOOL
- ☐ Commercial ☐ Good English
- ☐ High School Subjects
- ☐ Mathematics

LEADERSHIP
- ☐ Foremanship
- ☐ Industrial Supervision
- ☐ Leadership and Organization
- ☐ Personnel-Labor Relations

MECHANICAL AND SHOP
- ☐ Gas—Electric Welding
- ☐ Heat Treatment ☐ Metallurgy
- ☐ Industrial Engineering
- ☐ Industrial Instrumentation
- ☐ Industrial Supervision
- ☐ Internal Combustion Engines
- ☐ Machine Design-Drafting
- ☐ Machine Shop Inspection
- ☐ Machine Shop Practice
- ☐ Mechanical Engineering
- ☐ Quality Control
- ☐ Reading Shop Blueprints
- ☐ Refrigeration
- ☐ Sheet Metal Worker
- ☐ Tool Design ☐ Toolmaking

RADIO, TELEVISION
- ☐ Industrial Electronics
- ☐ Practical Radio TV Eng'r'ng
- ☐ Radio and TV Servicing
- ☐ Radio Operating
- ☐ Television Technician

RAILROAD
- ☐ Air Brakes ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Section Foreman

STEAM AND DIESEL POWER
- ☐ Combustion Engineering
- ☐ Diesel—Elec. ☐ Diesel Eng's
- ☐ Electric Light and Power
- ☐ Stationary Fireman
- ☐ Stationary Steam Engineering

TEXTILE
- ☐ Carding and Spinning
- ☐ Cotton, Rayon, Woolen Mfg.
- ☐ Finishing and Dyeing
- ☐ Loom Fixi'g ☐ Textile Des'ing
- ☐ Textile Eng'r'g ☐ Throwing
- ☐ Warping and Weaving

MISCELLANEOUS
- ☐ Domestic Refrigeration
- ☐ Marine Engineering
- ☐ Ocean Navigation
- ☐ Professional Engineering
- ☐ Short Story Writing
- ☐ Telephony

Name_____ Age_____ Home Address_____

City_____ Zone_____ State_____ Working Hours_____ A.M. to P.M._____

Occupation_____

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

Copyrighted material

Inventors

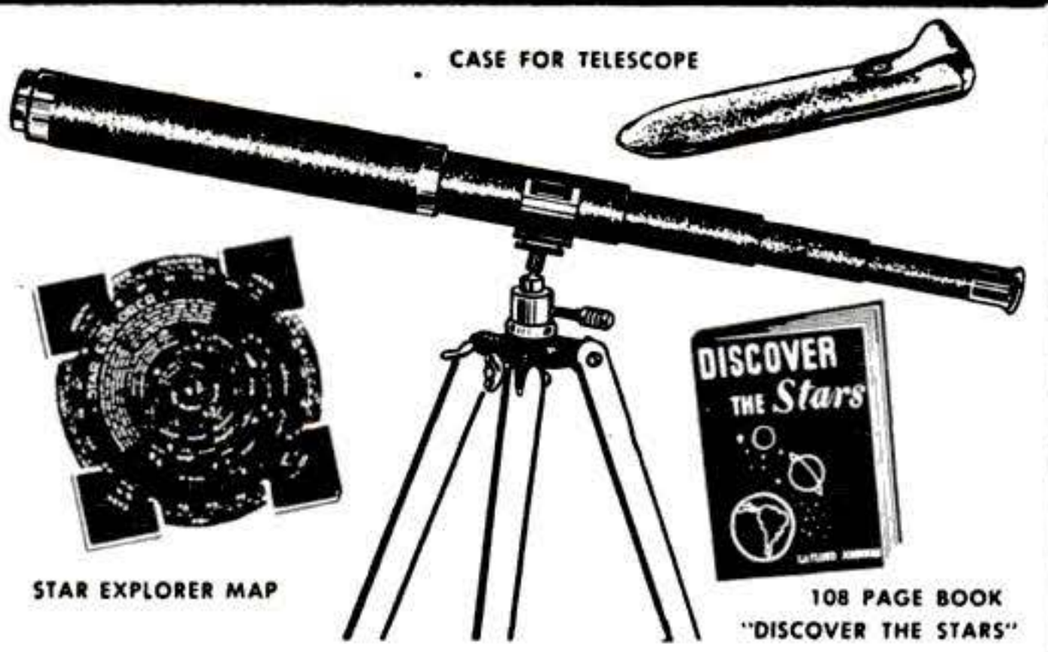
Take these necessary preliminary steps promptly to protect your invention by applying for a United States patent—

Sketch and describe your invention. Sign, date and have this disclosure witnessed by two people who understand your invention. Have us make a preliminary search among U. S. patents already granted for similar types of invention. We then report to you on the probable patentability of your invention and recommend your further course of action.

Write for our instructive booklet, "Patent Protection for Inventors" and our convenient "Evidence of Invention" disclosure form. No obligation.

VICTOR J. EVANS & Co. *Merlin M. Evans*
REGISTERED PATENT ATTORNEY
140-P MERLIN BUILDING, WASHINGTON 6, D. C.

105 POWER SUPER TELESCOPE



Everything for the Astronomer, Hobbyist, Student, & Scout in this complete astronomical super value telescope combination. Comes ready for immediate use, consists of brilliant 33X—65X—105X telescope, 5 foot hardwood Tripod, carrying case for scope, Star Explorer map, 108 page book "Discover the Stars." 3 foot telescope (closes to 16 inches) is brass bound, has 4 precision lenses that will bring distant objects, people, moon, stars, ships, etc., 105 times closer. 11,025 area magnification. All images erect. Sturdily built tripod is equipped with universal mount that has 360 degree horizontal range & 180 degree vertical range. Locks in any position with one simple adjustment. The Star Explorer map enables you to find any star automatically. This marvelous all purpose instrument is proclaimed by Scientists as a most unusual development. Everyone that has used it is amazed at its performance and value. It will fascinate the entire family. Shipped to you complete, nothing else to buy, at the amazing low price of . . . . . .

$11.95 POST PAID

Satisfaction guaranteed or money refunded. We pay all delivery charges. Send check or money order to DEPT. PSS8

CRITERION CO. 331 CHURCH ST., HARTFORD 1, CONN.

INVENTORS

PROTECT YOUR INVENTION BY A U. S. PATENT. SEND FOR FREE "INVENTION RECORD" FORM AND "PATENT INFORMATION EVERY INVENTOR SHOULD HAVE".

CARL MILLER
REGISTERED PATENT ATTORNEY
WOOLWORTH BLDG., 35th FLOOR, 125 C
NEW YORK CITY

PATENTS

C. A. SNOW & CO.
REGISTERED PATENT ATTORNEYS
WRITE FOR INFORMATION TO
426 SNOW BUILDING, WASHINGTON 1, D. C.

INVENTORS

Send for
PATENT INFORMATION
Book and
INVENTOR'S RECORD
without obligation
GUSTAVE MILLER
125-PS WARNER BUILDING
WASHINGTON 4, D.C.

REGISTERED PATENT ATTORNEY
ASSOCIATE EXAMINER
U.S. PAT. OFF. 1922-1929
Patent Attorney & Advisor
U. S. NAVY DEPT. 1930-1947
PATENT LAWYER

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH
Registered Patent Attorney
205 Columbian Building Washington 1, D. C.

INVENTORS

I shall be pleased to furnish you, upon request, with information relative to patent procedure—without any obligation on your part.

PATRICK D. BEAVERS
Registered Patent Attorney
937 Columbian Building, Washington 1, D. C.

LEARN NOW!

How to Become a
•GAME WARDEN
•GOVT. HUNTER
•Join Forestry, Wildlife Services!

Let your love of field & forest guide you to real success! Be a *career conservationist*—work with wildlife amid scenic surroundings, away from city pressures. Prepare now, spare-time. It's fun, fascinating! Enjoy good pay, security, prestige. No special schooling or experience required. Openings for men 17-45. HELP FILL DEMAND IN YOUR AREA! Write now—*today!*

HOME STUDY EDUCATORS
Dept. N12, 1036 S. La Brea, Los Angeles 19, Calif.

FREE SELECT-A-JOB CHART! Lets you match schooling, interests, etc. against many outdoor jobs. Write today for FREE "Success Plan" and chart details!

Copyrighted material

Now IN YOUR OWN HOME *Learn*

TELEVISION RADIO ELECTRONICS

the Amazingly Effective D. T. I. WAY

Above: Work over **300** fascinating experiments with this equipment

1. Build over 300 fascinating experiments from 16 BIG SHIPMENTS of Electronic-Radio parts which you KEEP.

2. Build valuable commercial-type test equipment—as shown to the left—which you KEEP. This includes a quality 5 INCH oscilloscope and vacuum tube voltmeter—both highly useful for Television work.

3. Build and keep a big 21 INCH TV Set. (D.T.I. offers another home training in Television-Radio-Electronics, but without the TV set.)

4. Use a 16 mm. movie projector and new series of highly instructive movies—a wonderful aid to help you grasp important fundamentals faster . . . easier . . . better.

5. Enjoy well-illustrated, easy-to-read lessons with handy FOLD-OUT diagrams.

6. Get an honest-to-goodness EMPLOYMENT SERVICE to help you get a good job after graduating—or assistance in starting your OWN SALES AND SERVICE BUSINESS. Mail coupon today for the complete details.

D.T.I.'s Training is available in Canada

HOME MOVIES

89 WAYS TO EARN MONEY IN TELEVISION RADIO-ELECTRONICS

—with the aid of BOTH HOME EQUIPMENT and HOME MOVIES

What will mailing the coupon below *do for YOU?* Just this! You'll find out about one of today's most remarkable . . . practical ways to prepare to get into America's amazing billion dollar opportunity field of TELEVISION-RADIO-ELECTRONICS. You'll see how to get into fascinating work that pays well . . . that offers one of America's most promising futures . . . that enables you to start your own business almost "on a shoe string," if you prefer this to a job opportunity.

And above all, you'll get some GOOD NEWS especially welcomed by men anxious to earn REAL MONEY in this thrilling field. For you'll see that NOW you can get the kind of practical, laboratory-type training so desirable for making real progress in Television-Radio-Electronics *AND WITHOUT* LEAVING HOME.

You'll see that DeVry Technical Institute sends everything needed to set up your own HOME LABORATORY. You get and keep the same type of basic electronic equipment used in our modern Chicago Training Laboratories. You get home training that includes the knowledge and experience gained from training thousands of students first hand in Chicago. And to top it all, you use DTI's amazingly effective and exclusive home training aid—INSTRUCTIVE MOVIES. But why not get the complete story? Mail coupon today for information-packed literature.

MODERN LABORATORIES

If you prefer, get all your preparation in our new Chicago Training Laboratories—one of the finest of its kind. Ample instructors, modern equipment. Write for details!

MILITARY SERVICE!

If you're subject to military service, the information we have for you should prove very helpful. Mail coupon today.

***Get this information-packed publication* FREE!**

Mail Coupon Today

DEVRY TECHNICAL INSTITUTE
4141 BELMONT AVE., CHICAGO 41, ILL.

MEMBER OF NATIONAL HOME STUDY COUNCIL

I would like your Opportunity News Bulletin showing "89 Ways to Earn Money In Television-Radio-Electronics"; also, complete facts about the training opportunity made possible by your organization.

Name _____ Age _____
(PLEASE PRINT)
Address _____ Apt. _____
City _____ Zone _____ State _____

D.T.I.'s Training is available in Canada — Dept. PS-12-L

DEVRY TECHNICAL INSTITUTE
CHICAGO 41, ILLINOIS
FORMERLY
DEFOREST'S TRAINING, INC.

Copyrighted material

49½¢ STORM WINDOW

protects your family . . . all winter . . .

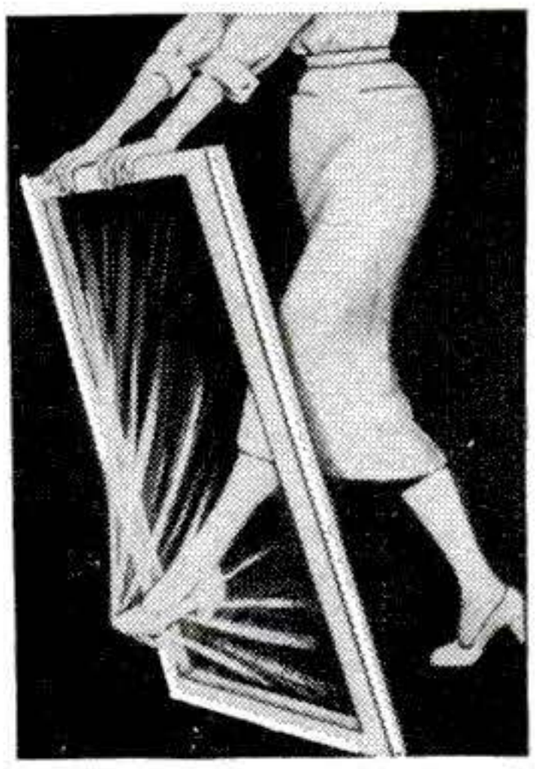
No Nails • No Hooks

No Tools • No Screws

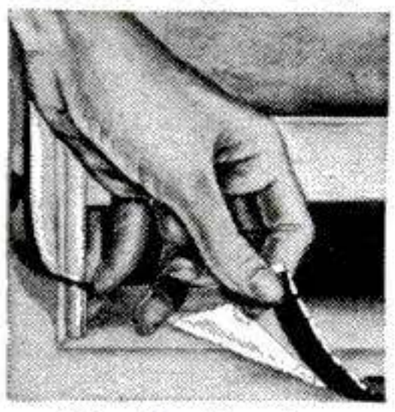
10.8 Sq. ft. Window only 49½c!

JUST PRESS ON—

that's all!



Now . . . Storm Windows need not cost up to $14.00. A world famous industrial firm developed this light weight flexible product that seals out wintry blasts for as low as 49½ cents a window! Imagine—for pennies you can insulate 'most ANY room in your home! This storm window is as transparent as glass yet can't peel, chip, shatter or rattle! Weighs less than 1/10 of the lightest glass windows developed—yet it has the tensile strength of over a TON per square inch! Crystal-clear, yet flexible like rubber! Not affected by snow, sleet, rain or dampness—because it's 100% waterproof. Won't crack at even 53 degrees BELOW FREEZING. Use and re-use YEAR AFTER YEAR for winter comfort and protection.



Lift Border for Airing

INSTALL IN 5 MINUTES

No nails, hooks, screws or tools. Just cut to fit window (any shape) then press on special Adheso Border. That's all! No hard work, no broken glass. Simple! Easy—a child can do it. Cleans easily with damp cloth, too! At winter's end, fold away like cloth for next year.

Over 2,000,000 Sold

No wonder so many home owners, hospitals, churches use this tried and true product—over 2,000,000 sold last year! A 36" x 432" TRANS-KLEER kit—108 sq. feet, enough for 10 windows of 10.8 sq. feet—complete with Adheso Border is $4.95, just 49½c a window! 10 glass windows would cost $79 to $160—you save a terrific sum on purchase *and* on fuel savings! Play safe—order NOW on trial. The factory can produce only so much—no more. Act fast, mail coupon now. Enjoy new comfort, feel the difference—even test with thermometer. Then, if not convinced, your $4.95 comes back! Only 2,500,000 can be made this year—and demand is going up! Avoid disappointment! RUSH COUPON TODAY!

THORESEN'S, Dept. 7-N-47
352 Fourth Avenue, New York 10, N. Y.

RUSH _____ Kits Trans-Kleer measuring 108 sq. ft. (10 windows averaging 10.8 sq. ft. each), with Adheso Border on 7 day trial—money back guarantee.

☐ Payment Enclosed. Send Prepaid.
☐ Send C.O.D. plus postage.

CHECK AMOUNT DESIRED

☐ 1 KIT (108 sq. ft.) for 10 windows—4.95
☐ 2 KITS (216 sq. ft.) for 20 windows—8.95

Name _____
Address _____
City _____ State _____

(Canadians: save tariff—order direct from Thoresen Ltd., 45 St. James St. W. Dept. US-47, Montreal 1, P. Q.)

EXPERIENCE IS THE BEST TEACHER. AN ESTABLISHED POLICY OF CAREFUL SELECTION ASSURES YOU MANY HAPPY MILES. BE WISE—TRY ONE—YOU'LL BUY MORE! WE WELCOME COMPETITION. NO ONE CAN TOUCH OUR QUALITY & PRICE!

22 YEARS AT THIS ADDRESS.

Free Tube with Mail Order
Special Discount Sale

PARTIALLY USED TIRES—AND OTHERS

DEDUCT $1.00 from every Passenger Tire you buy—Does not include W.W., Truck or Snow Tires

Specialists in Truck Tires—Selected for Toughest Jobs—Tops in Value
36 MOS. WRITTEN GUARANTEE WITH EVERY TIRE

600-16	$5.35	475-19	$4.75	700-15 (6)	7.15	700-20	$8.95
600-16 (6)	5.75	640-15	4.75	750-16 (8)	11.95	750-20 (10)	15.75
650-16	5.75	670-15	5.15	700-17	7.85	750-20 (8)	9.85
650-16 (6)	6.45	710-15	5.45	750-17	10.35	825x20	16.65
700-16	5.75	760-15	5.45	825-15	12.95	900-20	15.55
750-16 (6)	8.85	800-15	5.75	600-20	8.05	1000-20	15.75
550-18	4.55	820-15	5.75	650-20	8.35	1100-20	17.45
550-17	4.55	670-16	5.35	32x6 (8)	11.05	1100-22	18.95
650-15	5.35	760-16	7.05	32x6 (10)	13.95	1000-22	16.75
700-15	4.95	700-16 (6)	7.15	750-15	10.75	1100-24	23.05

ALL WHITE WALLS $1.00 EXTRA

"EXTRA SPECIAL" Some near New all size 4-ply pass. DEDUCT 1.00 from These also. —W. W. $1.00 Extra Factory Tested Tube given. GIANT TIRE SALE **$7.65 EA.**

SNOW TIRES Order any 4 Ply Passenger Size Black Wall 30 Mo. Guar. **$7.95 ea.**

Thousands of tires shipped all over the U.S.A. All tires shipped F.O.B. Phila. Send Check or M.O. with this ad. Dept. 5. No C.O.D.

STANDARD 834 N. Broad St., Philadelphia 30, Pa.

REAL ESTATE

BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes. Start and run your **own business quickly.** Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in classrooms in leading cities. Diploma awarded. Write TODAY for free book! No obligation.

FREE BOOK TELLS HOW

Approved for World War II and Korean Veterans

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)
2020S Grand Ave. Kansas City, Mo.

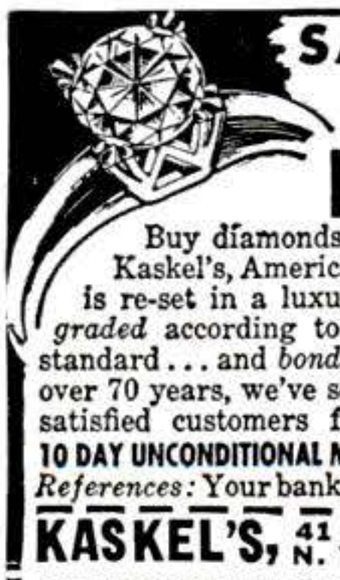
DOLLARS for 18¢?

Yes, buy U. S. $1.00 values for 18¢ abroad. Get new, big profit mail order plan proved by 100,000 cash-in-advance orders shipped to buyers from overseas. You carry no stock. Full or part time—even from home. Export and travel abroad opportunities too, for men and women. Big profit plan with bargain import examples FREE. Write Mellinger Co., Dept. E24C 1717 Westwood, Los Angeles 24, Calif.

Secrets of VENTRILOQUISM *Now Revealed!*

Easy to learn in 60 to 90 days with our Home Study Course. **RESULTS GUARANTEED.** Make Money! Be Popular! Have Fun! Big Opportunity! Radio, Television, Stage Appearances! For Free Information regarding price and terms, WRITE. You must state your age. Dummy Catalog 25c.

FRED MAHER SCHOOL OF VENTRILOQUISM
Box 36, Studio PS-12, Kensington Station
Detroit 24, Michigan



SAVE 50% & MORE!

GENUINE DIAMONDS

Buy diamonds and diamond jewelry half-priced from Kaskel's, America's foremost Pawnbroker. Every diamond is re-set in a luxurious new mounting... *graded* according to nationally accepted standard... and *bonded* to this effect. For over 70 years, we've served over 1,000,000 satisfied customers from all 48 States.

10 DAY UNCONDITIONAL MONEY-BACK GUARANTEE

References: Your bank, or any Rating Agency

SEND FOR BIG FREE ILLUSTRATED CATALOG

KASKEL'S, 41 West 57 St. N. Y. 19, Dept. 508M

Send FREE CATALOG and Advice about DIAMONDS without obligation.

NAME _____
ADDRESS _____
CITY _____ STATE _____

Copyrighted material

GET INTO RADIO-TELEVISION ELECTRONICS by Shop-Method Home Training

MASTER ALL PHASES!

Get Master Shop-Method Home Training from an Established Practical Resident School with its own Training Shops, Laboratories, Studios — almost 50 Years of Successful Experience in Training Ambitious Men.

We Bring National Schools To You!

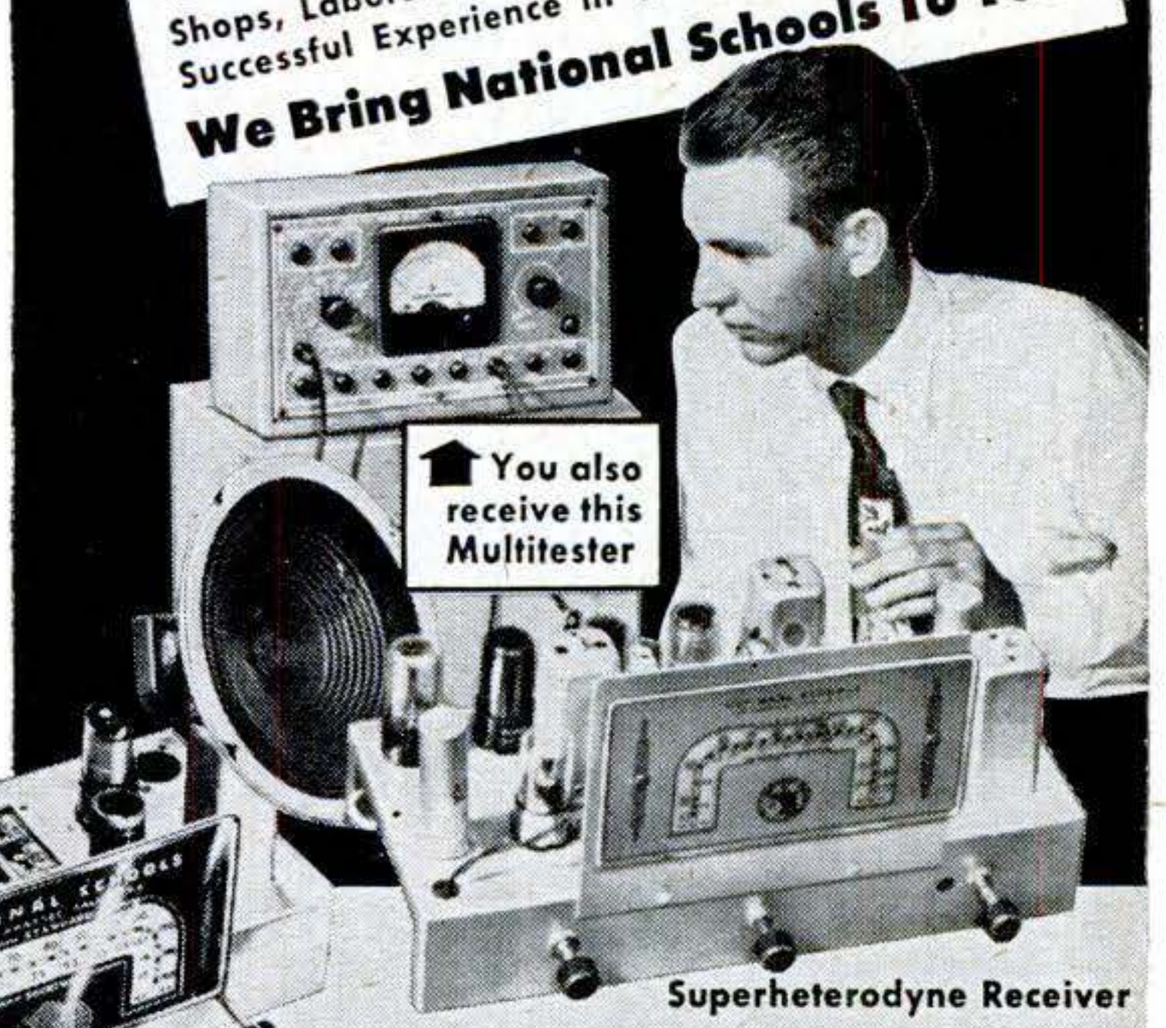
GOOD JOBS AWAIT THE TRAINED RADIO-TV TECHNICIAN

There is a place for *you* in the great Radio-Television-Electronics industry when you are trained as National Schools will train you at home!

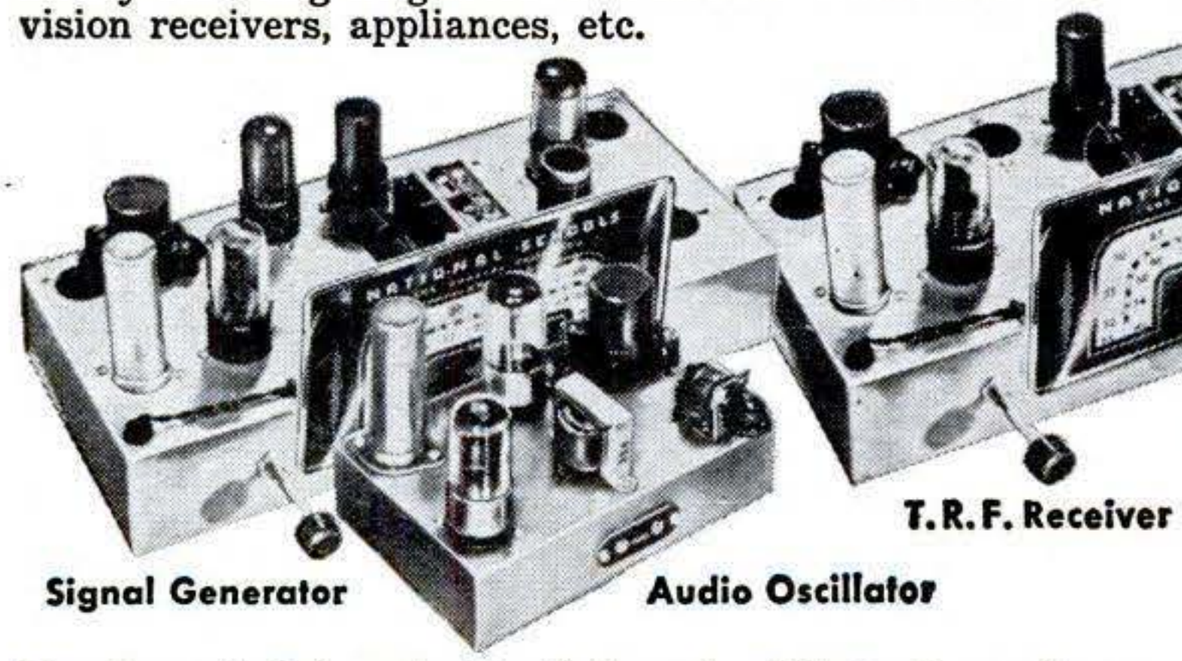
Trained technicians are in growing demand at good pay —in manufacturing, broadcasting, television, communications, radar, research laboratories, home Radio-TV service, and other branches of the field. National Schools Master Shop-Method Home Training, with newly added lessons and equipment, trains you in your spare time, right in your own home, for these fascinating opportunities. OUR METHOD IS PROVED BY THE SUCCESS OF NATIONAL SCHOOLS TRAINED MEN, ALL OVER THE WORLD, SINCE 1905.

EARN WHILE YOU LEARN

Many National students pay for all or part of their training with spare time earnings. We'll show you how you can do the same! Early in your training, you receive "Spare-time Work" Lessons which will enable you to earn extra money servicing neighbors' and friends' Radio and Television receivers, appliances, etc.



Superheterodyne Receiver



T.R.F. Receiver

Signal Generator

Audio Oscillator

LEARN BY DOING

You receive and keep all the modern equipment shown above, including tubes and valuable, professional quality Multitester. *No extra charges.*

FREE! RADIO-TV BOOK AND SAMPLE LESSON!

Send *today* for National Schools' new, illustrated Book of Opportunity in Radio-Television-Electronics, and an actual Sample Lesson. No cost—no obligation. Use the coupon now—we'll answer by return airmail.

National Schools Training is All-Embracing

National Schools prepares you for your choice of many job opportunities. Thousands of home, portable, and auto radios are being sold daily—more than ever before. Television is sweeping the country, too. Co-axial cables are now bringing Television to more cities, towns, and farms every day! National Schools' *complete* training program qualifies you in all fields. Read this partial list of opportunities for trained technicians:

- Business of Your Own • Broadcasting
- Radio Manufacturing, Sales, Service • Telecasting
- Television Manufacturing, Sales, Service
- Laboratories: Installation, Maintenance of Electronic Equipment
- Electrolysis, Call Systems
- Garages: Auto Radio Sales, Service
- Sound Systems and Telephone Companies, Engineering Firms
- Theatre Sound Systems, Police Radio
- And scores of other good jobs in many related fields.

APPROVED FOR VETERANS AND NON-VETERANS
Check coupon below

Both Resident and Home Study Courses Offered!

NATIONAL SCHOOLS

LOS ANGELES 37, CALIFORNIA • ESTABLISHED 1905
IN CANADA: 811W. HASTINGS STREET, VANCOUVER, B.C.

TELEVISION TRAINING

You get a complete series of up-to-the-minute lessons covering all phases of repairing, servicing and construction. The same lesson texts used by resident students in our modern and complete Television broadcast studios, laboratories and classrooms!

GET FACTS FASTEST! MAIL TO OFFICE NEAREST YOU!

(mail in envelope or paste on postal card)

NATIONAL SCHOOLS, Dept. RC-125

4000 S. Figueroa Street, Los Angeles 37, Calif. or **323 West Polk Street, Chicago 7, Ill.**

Send FREE Radio-TV Electronics book and FREE sample lesson. No obligation, no salesman will call.

NAME_____ BIRTHDAY_____ 19___

ADDRESS_____

CITY_____ ZONE____ STATE_____

Copyrighted material

$UCCE$$ $TORY...
MAN AND WIFE TEAM
MAKE $10,000 A YEAR!
FROM A SPARE-TIME START

FLOK KRAFT TRADE MARK REG.

Covers Plaster, Fabric, Wood, Metal, Plastic, Rubber —any surface!

NOW, PROFESSIONAL SECRETS CAN BE YOURS... George & Grace Hover are not in the "Genius" class but regular folks just like you and I—*They have learned the* FLOK-KRAFT Secrets and have a successful Big Profit business *all their own.* Why don't *you* join the Hovers. Help us fill *Huge Demand* for FLOK-KRAFT in all parts of the country.

PROFITS ARE BIG—DEMAND IS HUGE... *Big Profits wait* to be tapped in tremendous new field. There's a *Huge Demand* in every community for this *New Miracle Finish* that makes new products worth much more—makes old things beautiful & saleable. *Big-Profit orders* come from Manufacturers. Gift Shops, Dept. Stores, Hardware & Variety stores, Neighbors, Friends. FLOK-KRAFT can be applied to any surface whether brand new or old and worn. Gives a velvety, luxurious surface to instrument cases, hosiery and silverware drawers, radios, lamps, toys, signs, store displays, store fixtures, wearing apparel, figurines, auto dash boards, trunks, glove compartments—a thousand and one items to be seen on every hand easily and quickly beautified, enriched and increased in value with FLOK-KRAFT.

YOU CAN LEARN IN A FEW DAYS... Make to $5.00 —yes, even $10.00 *and more per hour.* Fully detailed and illustrated FLOK-KRAFT instructions—complete and *easy to understand* — every point explained—shows you how to *start right away* on the road to big money, *full or spare time.*

WE FURNISH EVERYTHING YOU NEED TO START... You also *get complete* FLOK-KRAFT *kit* of materials and special equipment that enables you to start at once. Add to your income from your regular job or begin to build a successful business of your own and do it all right in a corner of your basement, garage, service porch, kitchen or living room. Here is that "golden" opportunity you have been looking for to build a business of your own starting spare time—remember, your own business is protection against lay-offs or enforced retirement.

YOURS TO EXAMINE WITHOUT RISK... Grasp this lifetime opportunity today. I'll send you the complete FLOK-KRAFT outfit and instructions —*everything you need to start*—to examine leisurely right in your own home *without risk.* You owe it to yourself to investigate. Fill out and mail the coupon below for *free* FLOK-KRAFT Plan, and full details that show you how to learn to be a FLOK-KRAFT expert. *It's all FREE and Postpaid.* Airmail is quicker. **COAST INDUSTRIES, Dept. 1C Los Angeles 61, Calif.**

READ what others say about FLOK-KRAFT

"Received the Flok-Kraft outfit and everyone that saw it is very enthused. I only had it about thirty minutes and got an order for a $100 job." C. H., Maryland

"pleased with your Course and I'm being swamped with work to do." W. F., Pa

"I want to take a moment to thank you for the wonderful service. Several jobs and customers are well pleased." C. A. P., Mass.

"Many thanks for your fine course. Pleased with ease in which Flok-Kraft is applied. Have orders on hand and expect more." S. C. W., Md.

"Received your outfit . . . delighted Made sample glasses, everyone who sees them wants a set. Good future in Flok-Kraft." R. J. B. Penn.

SEND NO MONEY! JUST YOUR NAME AND ADDRESS

FREE! Complete PLAN! Full Details

COAST INDUSTRIES, Dept. 1C, Los Angeles 61, Calif.
Gentlemen: Please rush me FREE Plan and everything I need to be a FLOK-KRAFT Expert. I understand that it is free and Postpaid. I am under no obligation whatever.
NAME ____ STREET ____ CITY ____ STATE ____

more jobs than graduates

ENGINEERS Challenging opportunity! If you want interesting work in these fields pay you to write Box D including a complete history of your career and education.

Demand for our engineering graduates exceeds supply. *Effective placement service!* Study in this world-famed college . . . established 1884. New term starts quarterly. *Approved for veterans.*

Bach. Sc. degree in 27 months

Bachelor of Science in Mechanical, Civil, Electrical, Chemical, Aeronautical, Radio (T.V., Electronics), Administrative Engineering; Business Administration and Accounting. Also 36-weeks certificate course in Drafting. *Intensive program: technical fundamentals accented: comprehensive courses.*
Small classes: personalized instruction. For earnest, mature students whose time and budget require accelerated courses and *modest costs.* Preparatory courses. *Beautiful campus* in friendly college town. Well-equipped, new and modernized buildings and labs. Enter Jan., March, June, Sept. *Write Jean McCarthy, Director of Admissions, for Catalog, View Book and "Your Career in Engineering or Commerce."*

TRI-STATE COLLEGE
5125 College Avenue Angola, Indiana

MONEY for MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands, Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. ½c material makes regular 10c store sellers. Rubber moulds furnished for speed-production. Small investment brings good returns. We are now placing big chain store orders with manufacturers. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N. Y.

BIG BAG of STAMPS

WHAT TREASURES WILL YOU FIND? Big cloth bag contains more than 1,000 foreign stamps from over 30 countries in Asia, Africa, Europe etc., mostly still on paper, unpicked, unsorted, just as received from foreign missionaries, banks, etc. Nobody knows what's inside! Worth over $10 at Catalog prices. Money back guarantee.

Only $1.00

H. E. HARRIS & CO.
1879 Transit Boston 17, Mass.

Bar Bells

BUY DIRECT FROM FACTORY
Write for free booklet and price list
$8.95 up
INDEPENDENT IRON WORKS
2416 East 23rd Street, Dept. "C"
Los Angeles 58, Calif.

BIRTH RATE TO HIT NEW HIGH IN 1955

Latest census figures show that the nation's annual birthrate is well over the 4½ million mark and still climbing steadily. Economists say that a market is awaiting those with

Looking For An ENDLESS Source of Income?

A Baby Shoe Metallizing Business of Your Own Offers UNLIMITED Possibilities for Full or Part Time Earnings.

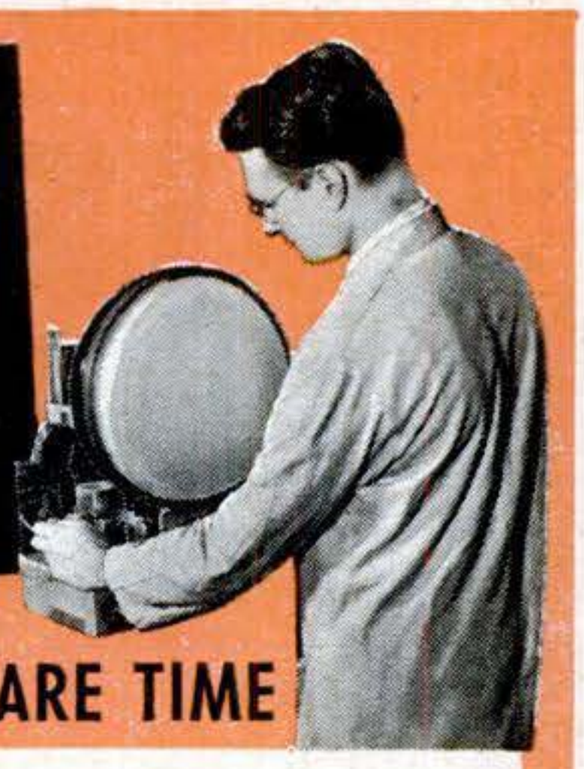
Think of it--Four and one-half million babies were born in the United States last year and the birth rate is increasing annually. Get your share of this huge market. Write for facts about our genuine metallizing equipment and supplies, complete instructions, plus the world's largest selection of beautifully plated all-metal baby shoe mounts. Send for FREE catalog today!

HOLLYWOOD BRONZE SUPPLY
Dept. B15 • 1624 East First Street • Los Angeles 33, California

Copyrighted material

L. C. Lane, B.S., M.A.
President, Radio-Television Training Association. Executive Director, Pierce School of Radio & Television.

VETERANS--NON-VETERANS
TRAIN *NOW* FOR A TOP-PAY JOB IN *TELEVISION*



No Experience Needed—I train you AT HOME *in your* SPARE TIME

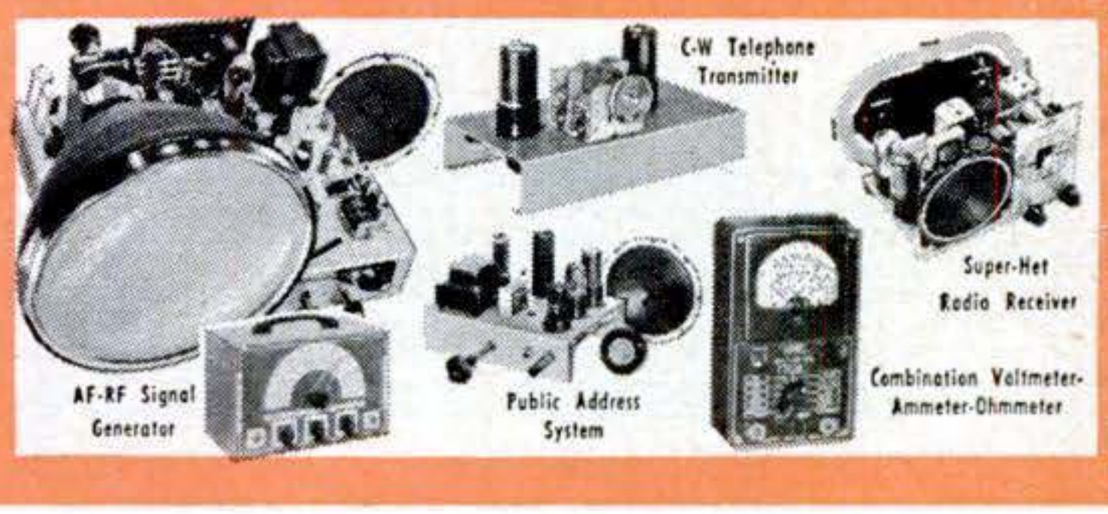
NOW — while the Television-Radio-Electronics industry is expanding at the fastest rate in history — is the time for you to prepare for a top-pay lifetime job . . . or your own profitable business.

New TV stations are going up constantly . . . sales of TV sets are breaking all past records . . . new products are being announced almost every day . . . new plants are springing up to meet the heavy demand for these products.

Trained men are needed urgently. The head of CBS-Columbia product service department estimates that the industry will need 200,000 service men by 1959. The best jobs will go to the men who are ready for them. *Right now* is the time for you to prepare yourself. Delay can be costly.

LEARN BY DOING

As part of your training I give you the equipment you need to set up your own home laboratory and prepare for a BETTER-PAY TV JOB. You build and keep an Electromagnetic TV RECEIVER designed and engineered to take any size picture tube up to 21-inch, (10-inch tube furnished. Slight extra cost for larger sizes.) . . . also a Super-Het Radio Receiver, AF-RF Signal Generator, Combination Voltmeter-Ammeter-Ohmmeter, C-W Telephone Transmitter, Public Address System, AC-DC Power supply. Everything supplied, including all tubes.



STUDY NEWEST DEVELOPMENTS

My training covers all the latest developments in the fast-growing Television-Radio-Electronics industry. You learn about FM — RADAR — COLOR TV — TRANSISTORS — PRINTED CIRCUITS, etc.

CHOOSE FROM THREE COMPLETE COURSES
covering all phases of Radio, FM and TV

1. Radio, FM and Television: Technician Course — no previous experience needed.
2. FM-TV Technician Course — previous training or experience in radio required.
3. TV Cameraman and Studio Technician Course — advanced training for men with Radio or TV training or experience.

EXTRA TRAINING IN N.Y.C. AT NO EXTRA COST!

After you finish your home study training in Course 1 or 2 you can have two weeks, 50 hours, of intensive Lab work on modern electronic equipment at our associate resident school, Pierce School of Radio & Television. THIS EXTRA TRAINING IS YOURS AT NO EXTRA COST WHATSOEVER!

FCC COACHING COURSE

Important for BETTER-PAY JOBS requiring FCC License! You get this training AT NO EXTRA COST! Top TV jobs go to FCC-licensed technicians.

FREE! I'll send you my new 40-page book, "How to Make Money in Television - Radio - Electronics," a Free sample lesson, and other literature showing how and where you can get a top-pay job in Television.

EARN WHILE YOU LEARN

Almost from the very start of your course you can earn extra money by repairing sets for friends and neighbors. Many of my students earn up to $25 a week . . . pay for their entire training with spare time earnings . . . start their own profitable service business.

VETERANS

My School fully approved to train Veterans under new Korean G. I. Bill. Don't lose your school benefits by waiting too long. Write discharge date on coupon.

MAIL THIS COUPON TODAY!

Mr. Leonard C. Lane, President
RADIO-TELEVISION TRAINING ASSOCIATION
Dept. P-12C, 52 East 19th Street, New York 3, N. Y.

Dear Mr. Lane: Mail me your NEW FREE BOOK, FREE SAMPLE LESSON, and FREE aids that will show me how I can make BIG MONEY IN TELEVISION. I understand I am under no obligation and no salesman will call.

(PLEASE PRINT PLAINLY)

Name_____ Age_____

Address_____

City_____ Zone____ State_____

I AM INTERESTED IN:
- ☐ Radio-FM-TV Technician Course
- ☐ FM-TV Technician Course
- ☐ TV Cameraman & Studio Technician Course

VETERANS! Write discharge date

NO SALESMAN WILL CALL!

Radio Television Training Association

52 EAST 19th STREET • NEW YORK 3, N. Y.
Licensed by the State of New York • Approved for Veteran Training

Copyrighted material

DIESEL

MECHANICS IN DEMAND

Learn to earn big pay in DIESEL in our large, modern equipped Chicago school and shop. No previous experience or training necessary. We help you find living quarters and part time job while in school.

Complete, practical courses taught in the following trades, under the supervision of experienced, expert technicians.

APPROVED FOR CIVILIANS ☐ OR GI'S ☐

—CHOOSE YOUR TRADE—

CHECK HERE	WEEKS
☐ DIESEL MECHANICS	20
☐ AUTO MECHANICS	20
☐ BODY & FENDER	16⅔
☐ GAS-ARC WELDING	4-12
☐ REFRIGERATION	13½
☐ AIR CONDITIONING	8⅓
☐ MACHINIST TRADE	30
☐ ADVANCED MACHINIST (includes tool & die)	32½
☐ PIANO TUNING & REPAIR	36

CHOOSE YOUR ENGINEERING COURSE

These courses are intended as terminal education for men who wish to enter the Diesel-Automotive and Refrigeration-Air Conditioning fields as technicians. These courses are designed to prepare men for supervisory positions. Students with a high school education, or equivalent, will be accepted.

☐ DIESEL AUTOMOTIVE ENGINEERING ..... 2 years

☐ REFRIGERATION & AIR COND. ENGINEERING ..... 18 months

FREE EMPLOYMENT HELP

Start your career with Greer by checking your interest above and mail coupon for complete information at no obligation.

NAME _____ AGE _____

STREET _____

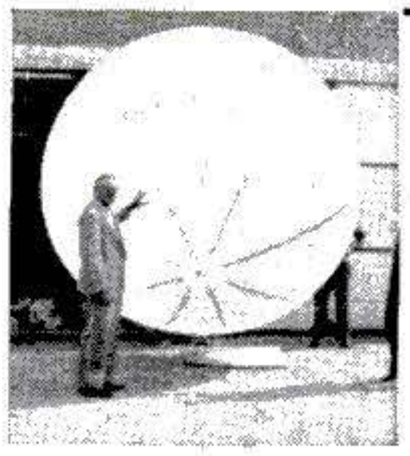
TOWN _____ ZONE ____ STATE _____

Established 1902—Over 50,000 Graduates

53 years of continuous trade school experience to guide your training.

GREER SHOP TRAINING

Box L, 2238 S. Michigan Ave.
Chicago 16, Illinois



GIANT BALLOONS 49c

They're really BIG—surplus U.S. Govt. (new overage) Neoprene weather, target balloons. GREAT FUN in the backyard: at parties, picnics, dances, fairs. TERRIFIC for high school and college PROMS. They attract BIG CROWDS to business openings, civic events, conventions, exhibitions, trade shows. ORDER TODAY! Approx. inflated sizes:

18 in. dia., 3 for 70c
3 ft. dia., 49c—5 ft. dia., 99c
10 ft. dia., $1.59

Postage paid on prepaid orders.

"Marksman" AIR PISTOL

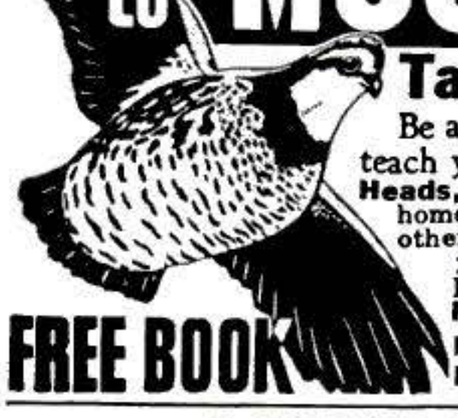
What fun during the holiday season to have target practice in rumpus room or basement; especially with this pistol that looks, feels, muzzle loads & cocks like an army .45. Wonderful in woods or backyard, too. Accurate, high-powered .177 cal. GREAT GIFT! Guaranteed. Yours, with free supply of BB's, darts & pellets—only..... **$5.95**

EXTRA AMMO—Darts, **50c** doz.—BB's **150** for **15c**—Pellets, **500** for **$1.50.**

NOTE: Add 10% for handling & delivery of air pistol & ammo. Full payment must accompany order for air pistol & ammo. Calif. residents please add sales tax on all items.

VOLUME SALES CO. WAR ASSETS DIV.
Dept. PS1255, 3930 Sunset Blvd., Los Angeles 29, Calif.

Learn to MOUNT BIRDS



Tan SKINS, make up FURS

Be a Taxidermist. *Double your hunting fun.* We teach you **at Home.** Mount **Birds, Animals, Fish, Heads,** common specimens. **Fun and profits.** Decorate home and den **MAKE MONEY.** Mount game, tan for others. Big profits in spare time. **WRITE TODAY.** **100 game pictures in FREE BOOK** Hunters, get your copy. It's **Now Free.** Send post card. State your **AGE.**

FREE BOOK

NORTHWESTERN SCHOOL OF TAXIDERMY
Dept. 2612 **Omaha, Nebraska**

A "GOOD HAND" HELPS YOU SUCCEED!

Your Name *beautifully written, plus special pen-point for shaded writing,* *Only 10¢*

LEARN TO WRITE WELL

OUR 53rd YEAR

Handwriting quickly improves with our easy-to-understand picture lessons! Put your spare time to good use: send today for ☐ FREE BOOKLET, "How to Become a Good Penman," or check volumes wanted below at $1 each: ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Bird & Design Flourishing ☐ Engrossing Alphabets. COMPLETE SET $4.50. Ask for price list of penman's supplies.

TAMBLYN SCHOOL of PENMANSHIP
S. A. Ziller, Pres. 438 Ridge Bldg., Kansas City, Mo., USA

"How to MAKE MONEY with Simple CARTOONS"

A book everyone who likes to draw should have. It is free; no obligation. Simply address

FREE BOOK

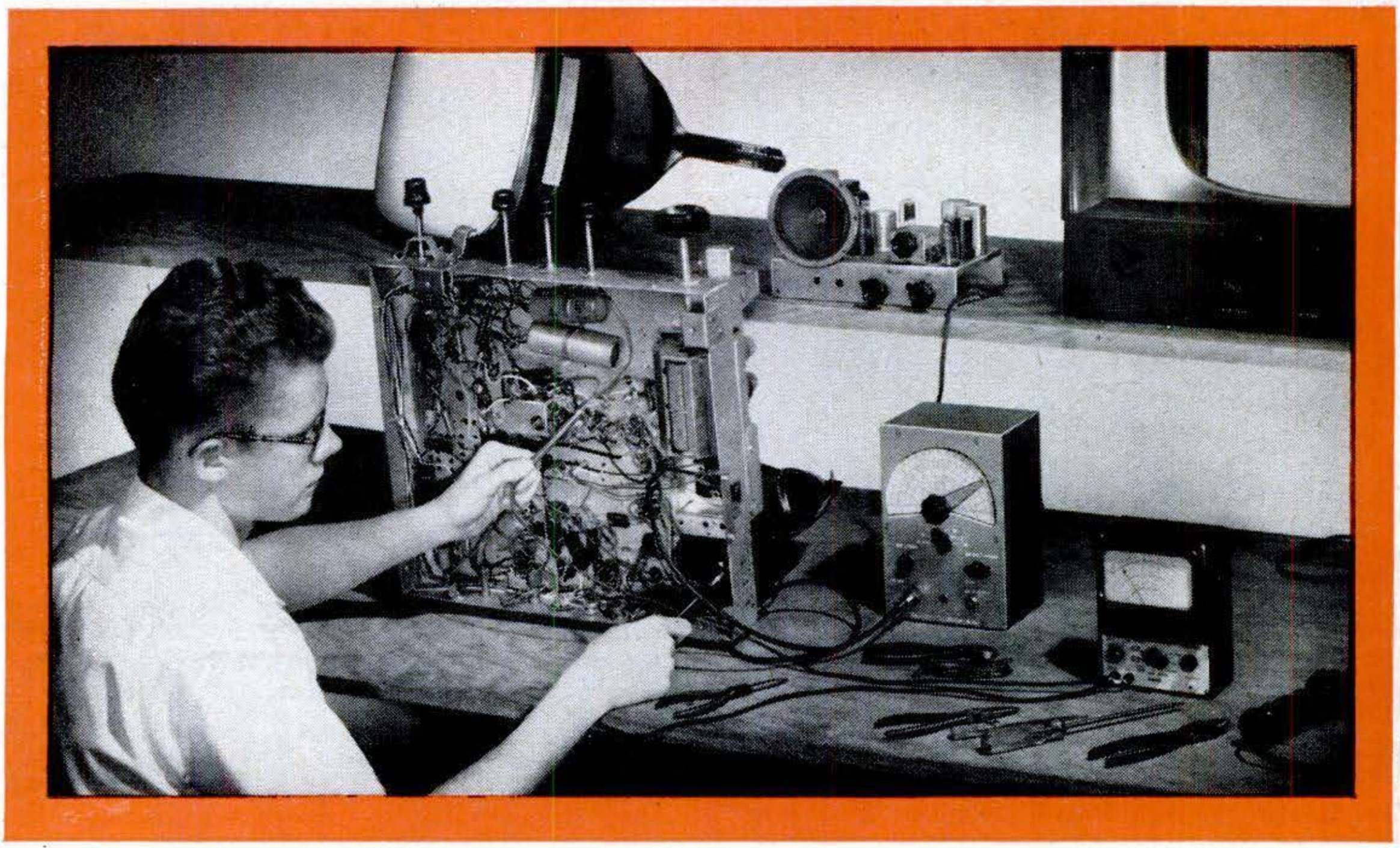
CARTOONISTS' EXCHANGE
Dept. 1912D, Pleasant Hill, Ohio

Nagging Backache Sleepless Nights

Nagging backache, headache, or muscular aches and pains may come on with over-exertion, emotional upsets or day to day stress and strain. And folks who eat and drink unwisely sometimes suffer mild bladder irritation . . . with that restless, uncomfortable feeling.

If you are miserable and worn out because of these discomforts, Doan's Pills often help by their pain relieving action, by their soothing effect to ease bladder irritation, and by their mild diuretic action through the kidneys — tending to increase the output of the 15 miles of kidney tubes.

So if nagging backache makes you feel dragged-out, miserable . . . with restless, sleepless nights . . . don't wait . . . try Doan's Pills . . . get the same happy relief millions have enjoyed for over 60 years. Get Doan's Pills today!



NOW...RCA trains you at home to be an expert technician in

RADIO TV ELECTRONICS • TV SERVICING • COLOR TV SERVICING

NOW THREE HOME STUDY COURSES . . . prepared by instructors of RCA Institutes in cooperation with technicians, engineers, and training specialists of RCA. Clearly written . . . easy to understand . . . the same high caliber instruction as given in resident classrooms of RCA INSTITUTES.

● COURSE I—RADIO-TELEVISION ELECTRONICS—starts you from the ground up to a solid working knowledge of electronics. Without any previous experience, you get a thorough training in radio theory and servicing techniques for AM, FM, home and car radios . . . plus an introduction to the fundamental theory and practices of television.

● COURSE II—TELEVISION SERVICING—prepares you to advance from radio into the expanding field of television servicing as a well-trained service technician. If you have completed Course I or are now working in the field of radio or TV, Course II will show you the many special techniques of trouble-shooting, aligning, checking, and repairing modern black and white TV sets.

NEW TV KIT AVAILABLE WITH COURSE II—there is no better way to learn than by *doing* and RCA Institutes has developed a large-screen TV KIT available to home study students to build while taking Course II. It has the most modern up-to-date circuitry, actually enabling you to apply at home all the latest servicing techniques.

● COURSE III—COLOR TELEVISION SERVICING—covers all phases of color servicing techniques. It is a practical, down-to-earth course in color theory as well as how-to-do-it servicing procedure. A natural move "up" from Course II or for those now employed in TV.

SINCE 1909, RCA INSTITUTES has trained thousands for sucessful careers in electronics. Many graduates have established their own paying business. Now this opportunity is available to you at home.

"PAY-AS-YOU-LEARN" PLAN . . . you pay for one study group at a time, as you progress through the course. Tuition costs are amazingly low. For full details, mail coupon.

A SERVICE OF RADIO CORPORATION OF AMERICA—RCA INSTITUTES is licensed by the N. Y. State Education Department . . . recommended by radio and television service organizations.

SEND FOR FREE CATALOG NOW

RCA Institutes, Inc., Home Study PS-125
350 West Fourth Street, N.Y. 14, N. Y.

Without obligation, send me FREE CATALOG on Home Study Courses in Radio, Television and Color TV. No salesman will call.

Name _____
Please Print

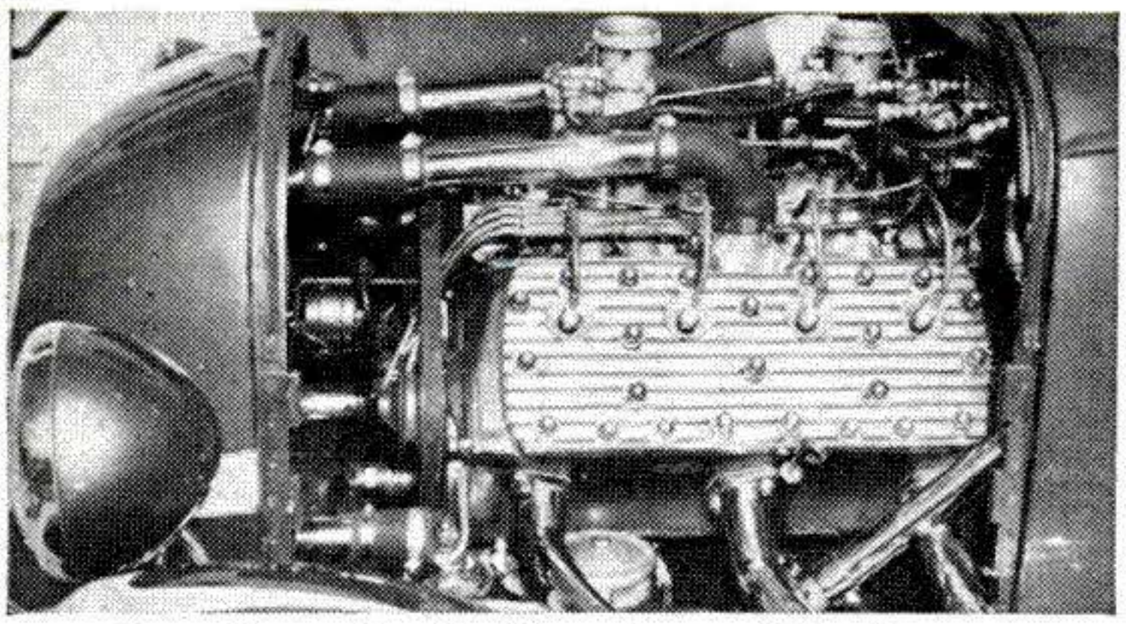
Address _____

City _____ Zone _____ State _____

RCA INSTITUTES, INC.
A SERVICE OF RADIO CORPORATION of AMERICA
350 WEST FOURTH STREET, NEW YORK 14, N.Y.

Copyrighted material

IF YOU "EAT, SLEEP AND LIVE" CARS... TURN YOUR HOBBY INTO A CAREER!



Get America's Big-time, Big-future

AUTO MECHANICS & DIESEL COURSE *at home in your spare time!*

Los Angeles' *National Schools,* America's automotive Technical Trade School since 1905, now brings its famous resident Shops and Faculty direct to you at home—to prepare you to earn more money, with job security, in today's fast-moving, opportunity-filled Auto Mechanics Industry! Get *your* home training from the "Car Capital of The World"—America's most auto-minded city, center of Hot Rod and Sports Car activity! Mail coupon right now!

"SHOP-METHOD" HOME TRAINING!

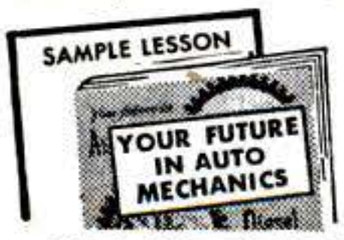
YOU MASTER ALL PHASES, INCLUDING DIESEL! All lessons fully illustrated. Latest equipment covered.

THIS SET OF LIFETIME TOOLS IS YOURS! Also all-metal tool box. Part of your course, yours to keep.

EARN WHILE YOU LEARN! We show you how to start Spare Time Earnings soon after enrollment.

ATTENTION MEN OF DRAFT AGE. Learn how you can achieve higher rating and pay. Mail coupon *at once!*

APPROVED FOR G. I. TRAINING. Both Home Study & Resident Courses
Free help with technical and personal problems—Job Placement Service



Send for FREE FACT-BOOK AND SAMPLE LESSON!
NOW! 2 offices to serve you faster! Mail coupon today to one nearest you!

NATIONAL SCHOOLS

Technical Trade Training Since 1905
LOS ANGELES 37, CALIFORNIA
IN CANADA: 811 West Hastings Street, Vancouver, B. C.

MAIL NOW TO OFFICE NEAREST YOU!

(mail in envelope or paste on postal card)
NATIONAL SCHOOLS, Dept. DC-125
4000 S. FIGUEROA STREET LOS ANGELES 37, CALIF. OR **323 WEST POLK STREET CHICAGO 7, ILLINOIS**

Send *FREE* Auto-Mechanics Book and Sample Lesson. No obligation, no salesman will call.

NAME _____ BIRTHDAY _____ 19__
ADDRESS _____
CITY _____ ZONE ____ STATE _____
☐ Check if interested ONLY in Resident School Training at Los Angeles.
VETERANS: Give Date of Discharge _____

INSURED TIRE SERVICE POPULAR BRANDS

SPECIAL! Deduct 10% on orders for Two or More used tires

FREE INSURANCE POLICY given with each used tire sold. We guarantee the amount of service you pay for.
NOWHERE CAN SUCH QUALITY BE FOUND AT SUCH LOW PRICE!

YOU CAN'T LOSE!!

GOODYEAR SUBURBANITE TYPE SNOW TIRES
New Tire Guarantee—Factory Rebuilt
BEST WINTER TRACTION OF ALL!

670x15, 600x16 **$9.95** | 710x15, 760x15, 650x16, 650x15 **$10.90**

Super Quality — Rugged Performance — 15 Months Insured Service

600x16	$3.65	670x15	$3.95	700x16	$4.45	760x16	$4.75
650x15	3.85	670x16	4.05	710x15	4.35	820x15	4.95
650x16	4.25	700x15	3.95	760x15	4.45	550x17	4.65

Supreme Quality — Nothing Finer — 30 Months Insured Service

600x16	$5.25	475x19	$5.45	700x15 (6)	$10.45	700x20	$12.50
600x16 (6)	6.75	640x15	4.95	750x16 (8)	15.95	750x20 (8)	15.50
650x16	5.75	670x15	5.35	700x17	11.95	750x20 (10)	17.50
650x16 (6)	7.25	710x15	5.45	750x17	16.45	825x20	21.50
700x16	6.35	760x15	5.95	750x15	10.95	900x20	19.95
750x16 (6)	8.45	800x15	6.35	30x5	11.25	1000x20	20.45
550x18	4.95	820x15	6.35	600x20	10.95	1100x20	21.25
550x17	4.75	550x15	5.35	650x20	11.75	1000x22	21.95
650x15	5.25	670x16	5.15	32x6 (8)	11.95	1100x22	22.75
700x15	5.35	700x16 (6)	10.25	32x6 (10)	12.75	1100x24	25.95

Whitewalls $1.00 extra.

MIDLAND TIRE SALES

Speedy shipments on Mail Orders. F.O.B. Chicago. Insurance policy sent with each order. Deduct 10% on orders for 2 or more used tires. Send CHECK or MONEY ORDER.—No COD's.
3701 S. Normal, Dept. SS-38, Chicago 9, Ill.

$14,839 In 1 Year SERVICING RADIATORS

—REX RYAN, Bloomfield, Iowa

Hundreds earning $8,000-$20,000 a year servicing auto-truck-tractor radiators! New Inland equipment makes work easy, insures finest professional workmanship. "Pays-for-itself" financing available. $100 training course included free by world's largest radiator servicing equipment manufacturer.

WRITE for free folder "Want a business of your own?"

INLAND MFG. COMPANY Dept. PS-12 **1108 Jackson St., Omaha 8, Nebr.**

CABINET MAKING

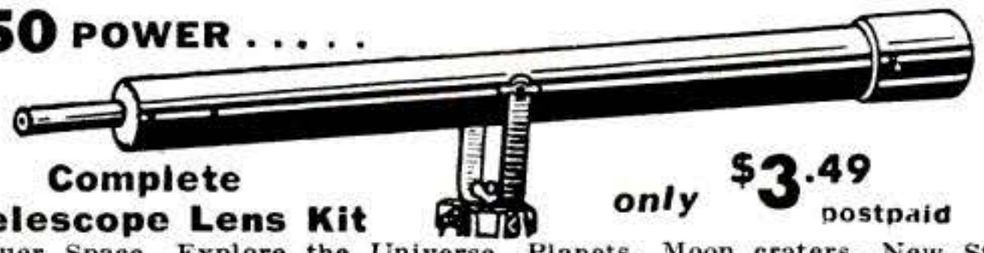
Write for Free Booklet

LOW COST HOME TRAINING COURSE FOR BEGINNERS & ADVANCED CRAFTSMEN

Make money. Learn skills and secrets of fine woodworking and tool use. Professionally prepared shop method training tells and shows how. Covers everything. Easy to master.

INTERSTATE TRAINING SERVICE
DEPT. F2, PORTLAND 13, OREGON

250 POWER . . . . .



Complete Telescope Lens Kit *only* **$3.49** postpaid

Conquer Space, Explore the Universe, Planets, Moon craters, New Stars, etc. Complete Lens Kit consists of 80 inch focal length ground and polished objective lens, eyepiece lenses for 50 POWER, 100 POWER, 150 POWER, 200 POWER, 250 POWER, and all necessary lens fittings. Easy to make from simple step by step instructions. (Tripod and mount not included.) Money back guarantee.

BUSSE SALES CO., Hartford, Conn., Dept. PS38

Don't Throw Old Radios Away!

CONTAINS "FIX-IT" DETAILS ON 4,800 RADIOS MADE BETWEEN 1925-1942!

Let Ghirardi's 744-page RADIO TROUBLE-SHOOTERS' HANDBOOK show you how to fix old radios good as new! Gives easy trouble-shooting and service instructions for old sets which dealers often say should be thrown away because repair details are no longer available. Covers specific troubles—NOT general theory. Eliminates useless testing. Covers 4,800 different models made between 1925 and 1942: Airline, Arvin, Atwater Kent, Belmont, Brunswick, Clarion, Crosley, Emerson, Fada, G-E, Majestic, Motorola, Philco, Pilot, RCA, Silvertone, Stromberg, Zenith . . . and almost 200 more! The only guide of its kind. Over 50,000 copies in use. Weighs 3½ lbs. Price only $6.50. Try it 10 days at our risk!

Dept. PS-125, RINEHART & CO., Inc.
232 Madison Ave., New York 16, N. Y.

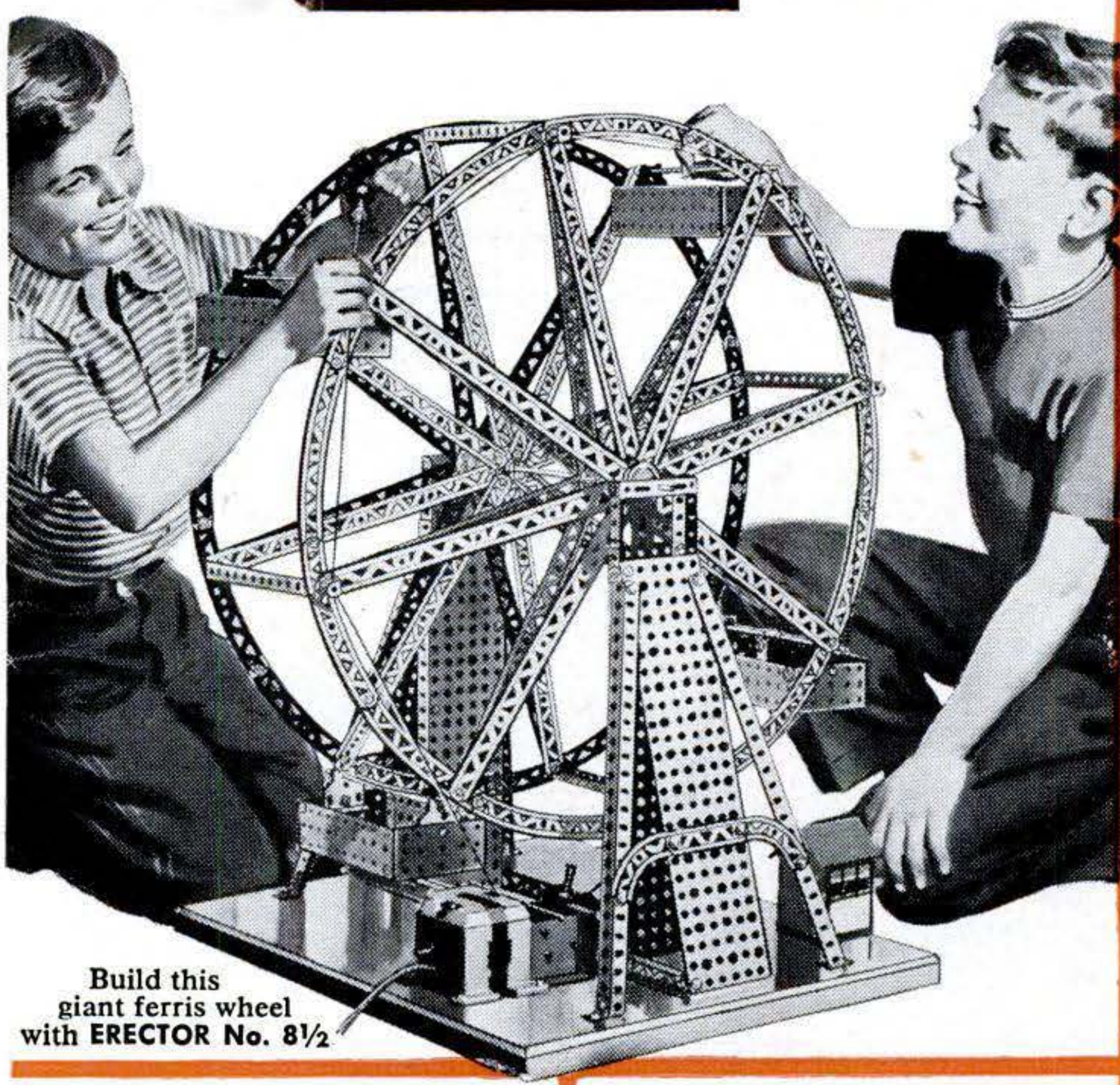
☐ Send TROUBLESHOOTERS HANDBOOK C.O.D. I will pay postman $6.50 plus postal charges.
☐ I enclose check or money order. You pay postage. Money will be refunded if I return book in 10 days.

Name .....
Address .....

Copyrighted material

Design, build, operate hundreds of all-steel action models with Gilbert

ERECTOR®



Build this giant ferris wheel with **ERECTOR No. 8½**

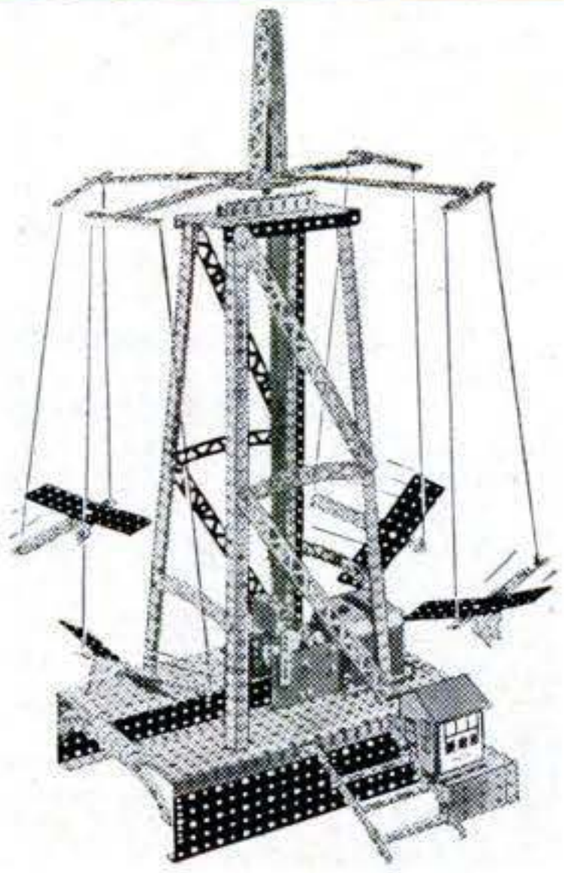
Construct hundreds of wonderful working models! It's easy and so much fun with Erector! Each set has loads of parts . . . rugged steel girders, heavy plates, precision-made gears, wheels and pinions. Design and build your own inventions, or use the "How to Make 'Em" book with your set. You'll create models that operate by remote control, run forward and reverse, glow with real electric lights! Erector is the original and *best build-it-yourself* set!

See exciting action Erector models now on display at your dealer's! They're fascinating to watch. Take Dad along. He'll love 'em, too. Pick the set you want for Christmas. Erector Sets start as low as $2.00.*

Write for Your Free Gilbert Toy Catalog Today!

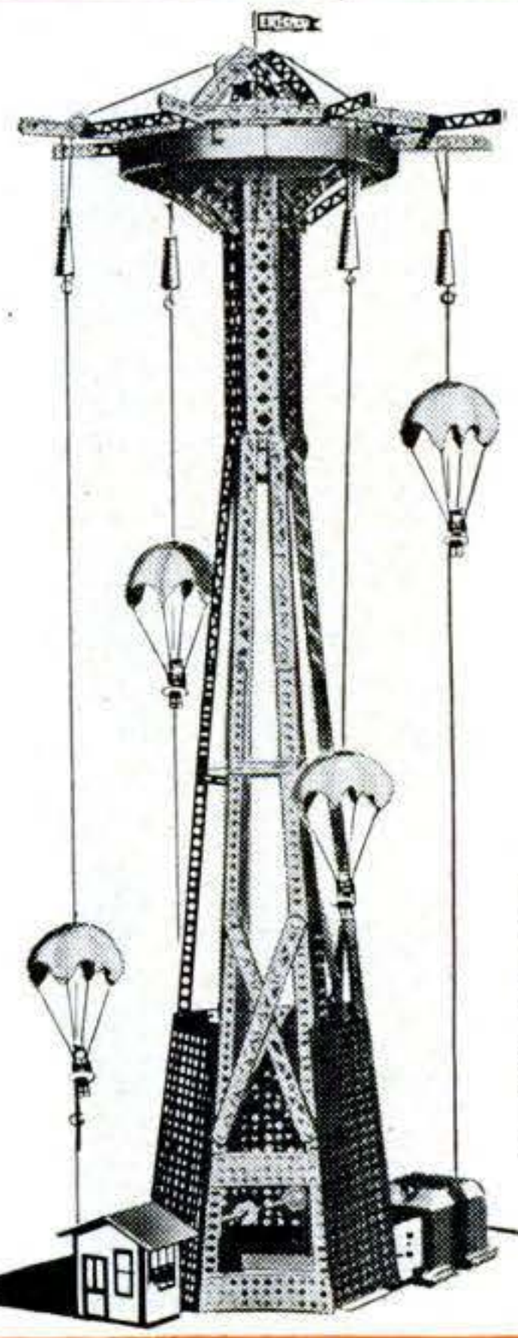
ERECTOR No. 6½—The Electric Engine Set. More than 325 real steel parts come packed in this big steel chest. Powerful motor runs in forward and reverse, has Magic-Twist coupling that sends power from the motor to the model in bends, twists and loops. Make a Windmill, Lift Bridge, Pump, Airplane Beacon and hundreds of other wonderful action models. Only..... **$14.95***

*Slightly higher Denver and West



You'll build this high-flying airplane ride with **ERECTOR No. 6½**

This Christmas Have Fun with Erector—The World's Greatest Toy – Manufactured by A. C. Gilbert, makers of American Flyer Trains, Chemistry Sets, Microscope Sets, and Tool Chests.



Make this big action parachute jump with **ERECTOR No. 10½**

Gilbert Hall of Science, Dept. E6
Erector Square, New Haven 6, Conn.

Please send your 4-color folder that illustrates and tells all about ERECTOR, Gilbert Chemistry and Microscope Sets, Tool Chests and other scientific toys.

Name _____

Address _____

City _____ **Zone** _____ **State** _____

Copyrighted material

Become an Electrical Engineer

- **Major in Electronics or Power**
- **Earn B. S. Degree in 36 months**

Over 50% of the nation's industrial leaders began their careers with engineering training. Prepare now for a rewarding future as an Electrical Engineer or Engineering Technician. Enroll at the Milwaukee School of Engineering.

Plan Your Career—Eight Courses Give You Wide Range of Study

ENGINEERING COURSES

Electrical Engineering-Bachelor of Science Degree

Save a valuable year through optional year 'round study.

Electronics major ..... 36 months
Power major ..... 36 months

TECHNICIAN COURSES

Electro Technician ..... 12 months
Electronic Technician ..... 12 months
Radio Technician ..... 12 months
Radio and Television Technician ..... 18 months

SERVICE COURSES

Electrical Service ..... 6 months
Radio and Television Service ..... 12 months

MECHANICAL TECHNOLOGY COURSES — Also available, Service and Technician courses 6 to 18 months — Heating, Refrigeration, Welding, Air Conditioning and Mechanical —B.S. Degree in Mechanical Engineering with a major in Design, Metal Fabrication, or Plant Engineering.
Also, general 3-month preparatory course.

Terms open January, April, July, September.

Prior Military, Practical or Academic training evaluated for advanced credit. Faculty of specialists. 50,000 former students. Annual enrollment from 48 states and 23 overseas countries. 52nd year. Non-profit. Residence courses only. Send handy coupon today. **MS-11A**

MILWAUKEE SCHOOL OF ENGINEERING

MILWAUKEE SCHOOL OF ENGINEERING
Dept. PS-1255, 1025 N. Milwaukee St., Milwaukee, Wis.
Send free illustrated career booklets ☐ Electrical Technology ☐ Mechanical Technology ☐ Radio-Television.
I am interested in_____
(name of course)
Name_____Age_____
Address_____
City_____Zone_____State_____
If veteran, indicate date of discharge_____

COMPLETELY ASSEMBLED TRANSISTOR RADIO

(direct from manufacturer)

STANDARD MODEL $8.95 (less phone) (2000 OHM)

- PNP TRANSISTOR
- CRYSTAL DIODE DETECTION
- SET GUARANTEED 3 YEARS
- COMPLETE WITH BATTERIES

DELUXE MODEL $13.95 (less phone)

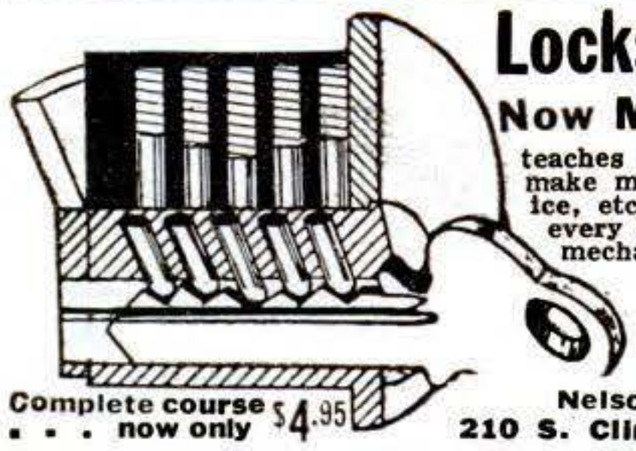
- 2 PNP TRANSISTORS & DIODES
- VOLUME CONTROL
- SET GUARANTEED 3 YEARS
- COMPLETE WITH BATTERIES

SUPER DELUXE MODEL $15.95 (less phone)

- BUILT-IN ANTENNA AND GROUND
- 3 PNP TRANSISTORS WITH DIODE
- CAPACITOR TUNING
- COMPLETE WITH BATTERIES

All sets built in plastic case smaller than a cigarette pack. Plays indoors or outdoors. Ideal for ball games, office, hospitals. Tunes several stations. Earphones $1.95 extra. Complete satisfaction or money-back. ORDER IMMEDIATELY FOR XMAS DELIVERY!! ALL PREPAID ORDERS SHIPPED FREE VIA AIRMAIL, (If C.O.D., plus charges).

MINI PRODUCTS CO.
9937 Culver Blvd. Culver City, Calif.



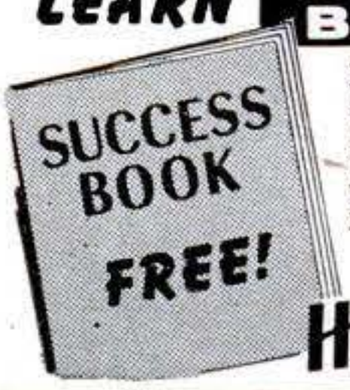
Locksmithing AND KEY MAKING

Now Made Easy! Practical up-to-date course teaches you how to pick locks, de-code, make master keys, repair, install, service, etc. New self-instruction lesson for every handyman, homeowner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith, 53 easy illustrated lessons. Full price only $4.95, postpaid; or C.O.D. plus postage. Satisfaction or refund guaranteed.

Complete course . . . now only $4.95

Nelson-Hall Co., Dept. MV-1
210 S. Clinton St., Chicago 6, Ill.

LEARN ACCOUNTING Business Administration



Bookkeeping, secretarial and allied subjects at home in your spare time or attend nationally approved resident school. Write today for FREE Success Book giving complete details on courses, plans, rates and employment opportunities. G.I. approved.

Member National Home Study Council

Hills BUSINESS UNIVERSITY AND EXTENSION SCHOOL, Dept. B.
629 W. Main St., Oklahoma City 2, Okla.

IT'S EASY . . . MAKE MONEY IN PHOTOGRAPHY

If you are over 17—good pay and fascinating work await you in photography! Start making money quickly in sparetime—step into your own studio or exciting career job. LEARN BY DOING method trains you at home! Write TODAY for FREE catalog. Also Resident Training. 46th Year. Approved for Vets.

NEW YORK INSTITUTE OF PHOTOGRAPHY
Dept. 5 — 10 West 33 Street — New York 1, New York
46th YEAR

CASTING SECRETS REVEALED!

Now you can learn how to make big money by casting thousands of perfect plaques, book ends, figurines, etc., with X.L. rubber molds.

NO EXPERIENCE, VERY LITTLE CAPITAL NEEDED

X.L., Rubber, Pts. $2.50; Qts. $4.00 (postage extra). Molds and enough rubber for three molds. $1.50 prepaid. U.S. only. Send 25c (refunded with order) for informative catalog (40 pages) describing this wonderful, exciting *Profit-making* business.

HUGE PROFITS! MORE MONEY!

PLASTIC ARTS STUDIO 3403 S. MADISON, DEPT. 3 MUNCIE, INDIANA

---

500 Treasured "Pirate" STAMPS

Get this big "Treasure Chest" of 500 prized stamps from such pirate strongholds as the Bahamas, Barbados, Haiti, Madagascar, etc. All different! Total catalog value guaranteed to be at least $10.00! 13 **special** stamps **FREE** if you act quickly. Other offers included for your inspection. Send your name and address with only 35c and this ad NOW to: **LITTLETON STAMP CO., Dept. PS-12, Littleton, New Hampshire.**

FOR ONLY 35c AND THIS AD

Copyrighted material

FIX ANY CAR ON THE ROAD TODAY!

Here's How!

NOW! Even beginners can handle practically ANY job on ANY make, model or part!

TUNE UP, PEP UP, *fix up* ANY automobile . . . even if you've never repaired a car before!

Handle practically any job "slick as a whistle."

A tune up? New rings? Ignition or carburetor troubles? Brake or clutch problems? A valve job? Something wrong with power steering or one of those tricky new automatic transmissions?

Just look up the job you want to do!

This giant, 4¾ pound CHILTON REPAIR MANUAL tells what to do. Then it shows you step by step just how to do it. No guess work. No lost time. You handle auto repairs easier, faster and better than you may have dreamed.

There's a "secret" to easy auto service and this giant manual is it!

YOU WON'T MISS

with how-to-fix-it data like this to guide you!

Chilton covers practically every part of every car on the road today. Gives complete service details on every model of the leading 20 car makes from June 1940 to the present. Over 600 models in all!

Tells how to locate troubles. Shows what work-saving shortcuts to take . . . what adjustments to make . . . what parts to use . . . what mistakes to avoid . . . *even what tools to use.*

"Minor" details, often so puzzling to beginners, are fully explained.

From beginning to end, it's an honest-to-goodness HOW-TO-FIX-IT guide. NOT a "study" book. You use it right at the bench when you've got a car to fix!

Use the CHILTON MANUAL *10 days . . . FREE.* If it's not all you expect . . . and more . . . return it postpaid AND DON'T OWE US A PENNY! Send coupon today to: Chilton Co., Dept. PS-125, 56th & Chestnut Sts., Philadelphia 39, Pa.

GIANT NEW ENLARGED EDITION

BY CHILTON, WORLD'S LARGEST AUTOMOTIVE PUBLISHERS

- 904 Big Pages
- Weighs 4¾ pounds
- Almost 3,000 clear pictures
- 58 Troubleshooting Charts
- 353 Quick Check Data Tables
- Thousands upon thousands of parts and service specifications

Covers Every Model of These 20 Makes Since 1940:

BUICK	FRAZER	OLDSMOBILE
CADILLAC	HENRY J.	PACKARD
CHEVROLET	HUDSON	PLYMOUTH
CHRYSLER	KAISER	PONTIAC
DE SOTO	LINCOLN	STUDEBAKER
DODGE	MERCURY	WILLYS
FORD	NASH	

PRACTICE 10 DAYS FREE!

THE CHILTON CO., Dept. PS-125
5605 Chestnut St., Philadelphia 39, Pa.

Send me the big 904-page **CHILTON "ALL CARS" REPAIR MANUAL** (Price $6.95) for 10-day FREE EXAMINATION. If I like Manual, I will then promptly remit $1.95 (plus 45¢ postage and handling); then send $2.50 each month for two months. Otherwise I will return manual postpaid in 10 days and owe you nothing.
SAVE! Send $6.95 with order and we pay postage-handling charge. Same return privilege.

Name .....

Address .....

City, Zone, State .....

(OUTSIDE U.S.A.—Price $8.95 cash with order. 10-day return privilege with money refunded.)

Read What These Users Say!

EASY! "The Chilton how-to-do-it pictures are worth the entire price of the Manual!"
MELVIN WADE, Penna.

FAST! "Thanks to my Chilton Manual, I did a job in an hour another mechanic had worked on all day!"
GENE ARNOLD, Iowa

(CHILTON BOOKS ARE SOLD BY LEADING BOOK STORES)

Copyrighted material

Some make more, some less; **T. THORN reports:**

$690 gross in single MONTH IN MY OWN BUSINESS!

Start YOUR OWN Business!

• Here's YOUR chance to start a money-making, year-'round business of your own and make the success you've dreamed about. R. O. Donnley took in $40 in seven hours. O. W. Ware landed a $750 hotel job. R. Traynor grossed over $450.00 in five days. Homes, hotels, offices, clubs, offer you big profit possibilities. Auto upholstery also.

NO SHOP OR OFFICE NECESSARY. You clean furniture on customers' premises. No hauling. No high rents. Supplies inexpensive; operate from your home. What you take in is mostly profit.

• If you want to be your own boss—free from layoffs, strikes and bosses, we will help you to start and succeed. Don't delay ...read the facts, then decide for yourself.

MAIL COUPON TODAY FOR FREE BOOK

VON SCHRADER MFG. CO.
W11 "D" Pl., Racine, Wisconsin

Without obligation rush your **FREE** booklet about how I can start my own permanent, profitable electric Upholstery Cleaning business.

Name _____

Address _____

City _____ Zone ____ State _____

HYPNOTISM

BE POPULAR • AMAZE • ENTERTAIN

Learn to apply Hypnotism and Autosuggestion in short time, by training at home, with GUARANTEED RESULTS — DON'T DELAY. Write to America's oldest, most famous Hypnotic school for free information - now - today.

JUST FILL IN COUPON AND MAIL

SCHOOL OF APPLIED HYPNOLOGY
Dept. 212
120 Central Park South, N. Y. 19, N. Y.

Please send me Free information:

SENT IN PLAIN WRAPPER

NAME.....

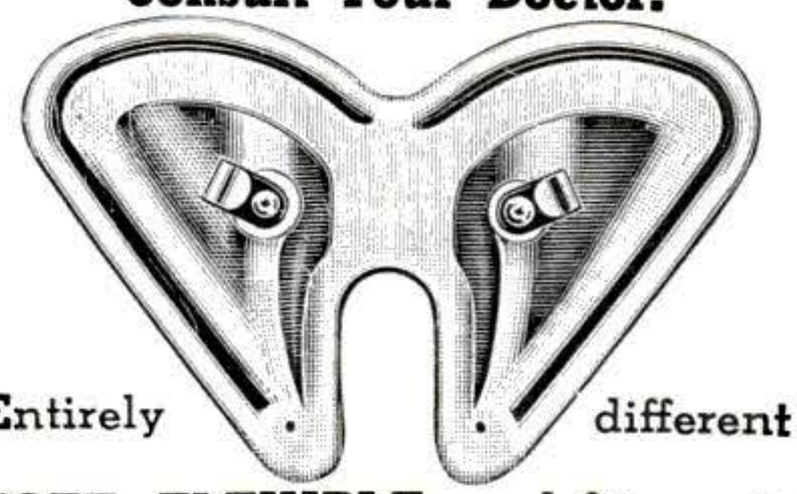
ADDRESS.....

CITY.....STATE.....

If Ruptured

For lasting relief your rupture must BE HELD BACK DAY and NIGHT.

Consult Your Doctor.



Entirely different

SOFT, FLEXIBLE, and fits neat as a glove. The famous Miller saves you TIME, MONEY, DISAPPOINTMENT. Write for my FREE booklet today.

FRED B. MILLER Manufacturer
Dept. P-A Hagerstown, Maryland

CUT BUILDING COSTS ⅔

Make Your Own Concrete BLOCKS and BRICKS To Use or Sell

New superior moulds make absolutely square, true, easy-to-lay blocks which will pass any building code. Production is fast . . . easy. One durable $30 machine will make four 5"x8"x12" blocks per minute—1,000 a day. Pays for itself in one day! Sell blocks for big profit . . . or save ⅔ building cost for yourself. POST CARD BRINGS FREE FOLDER.

ECONOMY MFG. CO.
DEPT. S STONE MOUNTAIN, GA.

AUTO MECHANICS

FAST, NEW WAY TO LEARN — TOOLS AND TUNE-UP KIT SENT

Thousands of top-pay jobs must be filled. **Earn up to $125 a week and more.** Or, start in business. CTI **Shop-Proved** Home Training is practical. You get valuable tools and a Tune-Up Kit. Earn spare time dollars while learning. **Write for FREE BOOK today.**

COMMERCIAL TRADES INSTITUTE, Dept. A-121
1400 Greenleaf Ave. Chicago 26, Illinois

Send for **FREE BOOKLET**

LEARN LOCKSMITHING

Learn this fascinating, profitable trade from experts in your spare time at home!
Age or physical handicap no disadvantage. **Year around, steady income. Full or part time.** Practical, illustrated lessons. You can make money even while learning! All materials and special tools supplied without extra charge.

LOCKSMITHING INSTITUTE. Dept. PS-72
15 PARK AVENUE RUTHERFORD, N. J.
Lic. by N. J. State Board of Education
Approved for Veterans

FREE TV & RADIO SERVICING MANUALS

and Descriptive Literature on "Edu-Kit"— **You Build 16 PRINTED CIRCUIT and METAL CHASSIS RADIO CIRCUITS at Home** with the New Deluxe 1956

PROGRESSIVE RADIO "EDU-KIT"

ONLY $19.95 COMPLETE

All parts, chassis, instructions, Soldering Iron, Tester included. 30 Day Unconditional Money-Back Guarantee

Gentlemen: Please Rush me FREE Descriptive Literature concerning "Edu-Kit." Also send me FREE TV & Radio Servicing Manuals. No obligation.

Name.....

Address.....

.....

Progressive "Edu-Kits" Inc., Room 536A, Progressive Bldg., 497 Union Ave., Brooklyn 11, N. Y.

Copyrighted material

America Discovers the Lifelong Battery

Sintered Plates for greater power reserve, longer life.

Capillary Separators keep plates moist and active at all times.

Mild Type Electrolyte No strong acids to corrode inside of battery.

New Type Condenser Vent Caps Preserve water supply by condensing vapors.

New High-Impact Type Case: Larger capacity, greater strength and resistance to chemicals.

*U. S. PAT. APP. NO. 408439

Requires Water Only Once a Year, because of the extra margin of water reserve.

Galvic Cell Shield prevents accidental damage to plates.

10 YEAR BONDED FACTORY GUARANTEE

The Longest & Strongest Battery Guarantee Ever Issued

The LIFE-LONG BATTERY is guaranteed for more years than any battery on the market. The ten-year bonded guarantee is issued and backed by the factory and is honored by any one of LIFE-LONG's 20,000 dealers throughout the United States. As a further protection to the buyer, the factory ten-year guarantee is bonded by a state licensed escrow company. The LIFE-LONG ten-year guarantee features free replacement and remains in effect no matter how many times the battery is transferred from car to car. Every LIFE-LONG BATTERY carries a serial number which is permanently registered at the factory for your protection.

$1,000 REWARD

for anyone who proves a LIFE-LONG BATTERY will not recuperate within 60 seconds after complete rapid discharge. This reward money is on deposit at the Bank of America.

NEW TYPE BATTERY NOW AVAILABLE FOR AUTOMOTIVE USE

LIFE-LONG BATTERIES, with the revolutionary new *sintered plates*, were originally designed for commercial and industrial use in submarines, locomotives, steamships and large stationary engines, but American "know how" and mass production methods have reduced their costs to the level of ordinary batteries, making them available to the motoring public.

USED ALL OVER THE WORLD

First sold in Europe, tens of thousands of LIFE-LONG Bonded 10-Year BATTERIES are in daily use throughout the world. To date not one failure has been reported! LIFE-LONG BATTERIES have been tested and approved by hundreds of large corporations, utility companies, police and fire departments, U.S. and foreign governments.

Many large firms, including original equipment manufacturers, are switching to LIFE-LONG as old-type batteries fail. Where safety is essential—in signal beacons, hospital emergency lighting, standby telephone electric supply systems—you find LIFE-LONG BATTERIES.

LIFE-LONG BATTERY STARTS TEST ENGINE 606,969 TIMES IN TORTURE TEST

In "torture tests" conducted by an authorized member of the American Council of Commercial Laboratories, a LIFE-LONG BATTERY started a test engine over and over again—day in and day out, without pause, for more than a year. After making 606,969 starts, the battery finally was worn down! No other battery can equal this record! This LIFE-LONG BATTERY was no different than the one you can buy for your car. It is good for at least a half a million starts—the equivalent of starting your car thirty times a day for fifty years.

Proved Superior by Laboratory and Road Tests

S.A.E. TEST: Life-Long Battery is 100% more efficient than required by S. A. E. Overcharge Test.

COLD TEST: Life-Long performs efficiently after "soaking" at 70° below zero for 24 hours.

LIGHT METER TEST: Your lights are 50% brighter with a Life-Long.

R. P. M. TEST: Life-Long spins your engine at least 20% faster, gives you easier, quicker starts.

CAPACITY TEST: Life-Long has 40% greater reserve capacity than ordinary batteries.

LIFE CYCLE TEST: Life-Long produces an incredible 606,969 cycles.

SAVE $70.00 OR MORE!

A LIFE-LONG 10-YEAR BATTERY actually costs less than an ordinary battery—saves you $70 or more! On a yearly basis, LIFE-LONG costs you only $3.00 a year while a so-called "first quality" three-year battery costs you $10. Thus LIFE-LONG gives you a direct saving of $70.00 over its ten-year warranty period.

OPPORTUNITY FOR DISTRIBUTORS • Many choice territories are still available. All territories are awarded on an exclusive basis—protected by a written franchise. No charge for franchise. Write, wire, or phone today. Cable: Lifelong.

ALL 6-VOLT LIFE-LONG AUTO BATTERIES $29.95

ALL 12-VOLT LIFE-LONG AUTO BATTERIES $34.95

Complete line of Industrial, Commercial, Marine, Motorcycle and Aircraft Batteries.

LIFE-LONG BATTERY MFG. CORP.
11766 WEST PICO BOULEVARD, LOS ANGELES 64, CALIFORNIA

LIFE-LONG BATTERY MFG. CORP. DEPT. PS-125
11766 West Pico Blvd., Los Angeles 64, California

Please ship Life-Long Battery, 10-year guarantee: ☐ 6 volt automotive battery ($29.95 including tax) ☐ 12 volt automotive battery ($34.95 including tax)

for _____
Make & Model, Year of Car

Cash, check or money order enclosed. Life-Long pays all delivery costs to your door.

Name _____

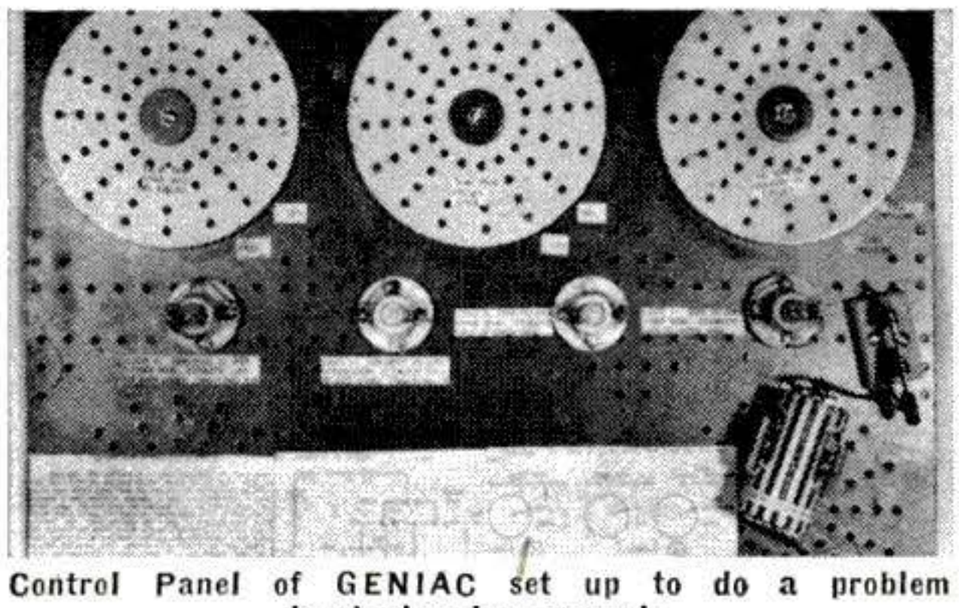
Address _____

City _____ Zone ____ State _____

Copyrighted material

ELECTRIC BRAIN KIT—

Can you think faster than this Machine?



Control Panel of GENIAC set up to do a problem in check valve research.

Be careful before you answer. GENIAC the first electrical brain construction kit is equipped to play tic-tac-toe, cipher and encipher codes, convert from binary to decimal, reason in syllogisms) as well as add, subtract, multiply and divide. Specific problems in a variety of fields—actuarial, policy claim settlement, physics, etc., can be set up and solved with the components. Connections are solderless and are completely explained with templates in the manual. This covers 33 circuits and shows how new ones can be designed.

You will find building and using GENIACS a wonderful experience; one kit user wrote us: "this kit has opened up a new world of thinking to me." You actually see how computing, problem solving, and game play (Tic-tac-toe, nim, etc.) can be analyzed with Boolean Algebra and the algebraic solutions transformed directly into circuit diagrams. You create from over 400 specially designed and manufactured components a machine that solves problems faster than you can express them.

Schools and colleges, teachers of science or math, engineering, philosophy or psychology will find these excellent demonstrators of circuitry, solutions in symbolic logic, theory of numbers, cybernetics, and automation.

Note: Teachers take advantage of our 10% discount to educational institutions and for group purchases.

SEND for your GENIAC kit now. Only $19.95 with over four hundred components and parts, fully illustrated manual and wiring diagrams. We guarantee that if you do not want to keep GENIAC after two weeks you can return it for full refund plus shipping costs.

MAIL THIS COUPON

SCIENCE KITS, Dept. PE 12, Oliver Garfield Co.
126 Lexington Avenue, New York 16, N. Y.

Please send me:

1 GENIAC Electric Brain Construction Kit and Manual.

$19.95 (East of Mississippi) .....

$20.95 (Elsewhere in United States) .....

$21.95 (Outside the United States) .....

Returnable in seven days for full refund if not satisfied.

I enclose $..... in full payment.

My name and address are attached.

HOBBIES FOR *Profit*

CASTING

GLASS ETCH

HAVE FUN!
MAKE BIG MONEY!
WE SHOW YOU HOW!

Enjoy hobbies that make money! Make beautiful and UNUSUAL items for the home and business. Make exquisite jewelry, ceramics, without a kiln, toys, dolls, puppets, tools, Planters, embedded Plastics, Metal Enamelling, etc. Learn Jewelry Making, Wirecraft, Photocraft, Woodcraft, Metalcraft, Leathercraft, Mold Making, Bait Making, Gemcraft, Plastic Laminating, Lampcraft, Featherecraft, Basket Weaving, etc. Over 1000 Golden Opportunities! Send 25¢ for giant-sized catalog giving full facts on all these Hobbies.

HOBBIES FOR PROFIT
6612 N. Clark Street
Dept. HP-204, Chicago 26, Illinois

MOLDING

PLASTER

Shrinks Hemorrhoids New Way Without Surgery

Science Finds Healing Substance That Relieves Pain—Shrinks Hemorrhoids

For the first time science has found a new healing substance with the astonishing ability to shrink hemorrhoids and to relieve pain – without surgery.

In case after case, while gently relieving pain, actual reduction (shrinkage) took place.

Most amazing of all – results were so thorough that sufferers made astonishing statements like "Piles have ceased to be a problem!"

The secret is a new healing substance (Bio-Dyne*)—discovery of a world-famous research institute.

This substance is now available in *suppository* or *ointment form* under the name *Preparation H.** Ask for it at all drug counters—money back guarantee. *Reg. U. S. Pat. Off.

MEN WANTED

Earn $100 Per Week and up

AUTO DIESEL MECHANICS

Master a trade with a future—learn Auto-Diesel mechanics in our shops. You learn with tools on real equipment. Earn while you learn. Many of our graduates earn $100 per week and up. No previous experience necessary. Day and night courses. Approved for veterans. Write for free bulletin.

NASHVILLE AUTO-DIESEL COLLEGE

226 7th Ave., N., Dept. 41 — Nashville 3, Tenn.

HE-MAN VOICE!

STRENGTHEN *your* voice this tested *scientific* way. Yes—you may now be able to improve the POWER of your speaking and singing voice . . . in the privacy of your own room! Self-training lessons, mostly silent. No music required.

FREE BOOK Write TODAY for Eugene Feuchtinger's great booklet "How to Develop a Successful Voice." It's absolutely FREE! You must state your age. Booklet mailed postpaid in plain wrapper. No salesman will call. Send your name and age RIGHT NOW! **Prefect Voice Institute, 210 S. Clinton St., Studio MV-1. Chicago 6, Ill.**

BUILD LUGGAGE AT HOME! WE SELL YOUR PRODUCTS!

Only New Home Money-Making Plan in Years!

Make Luggage and cases for traveling, photographers, musicians, salesmen, electronics, tools, portables, 1001 other items. Also repair Luggage. No special equipment needed. BIG Profits. We supply complete instructions, materials—everything. Write for free details and Business Plan. ABARSI CASE-CRAFT, Dept. H, 805 W. Sunset Blvd., Los Angeles 12, Calif.

FIND URANIUM!!!

Prospecting made easy with Goldak's new U-238C triple-action geiger counter! Also famous line of metal locators, from $49.50

Send 25c for radioactive uranium sample!

FREE DETAILS. Dealer Inquiries Welcome.

GOLDAK COMPANY 1544 W. Glenoaks Blvd., Glendale, Calif.

NO TANKS USED
NEW SIMPLIFIED METHOD

ELECTROPLATE

ANY OBJECT IN HOME, SHOP, GARAGE OR START YOUR OWN WELL PAYING ELECTROPLATING BUSINESS.

TOOLS, SILVERWARE, HOUSEHOLD ARTICLES, JEWELRY, BABY SHOES, AUTO PARTS & 1001 ARTICLES

NOW, using **NEW** plating kit, it's easy to electroplate any object. Complete kit and instructions on plating metal and non-metal objects, with nickel, copper, chrome, gold, etc., plus full data on obtaining all the business you desire and make **BIG MONEY** full or spare time. **ONLY** $5.95. **SEND NO MONEY**—everything sent **C.O.D.** plus postage—OR send $5.95 now and receive it postpaid. Money back in 7 days if not satisfied.

M. Z. SALES CO., Dept. PS-21, 113 W. 42 St., New York 36, N. Y.

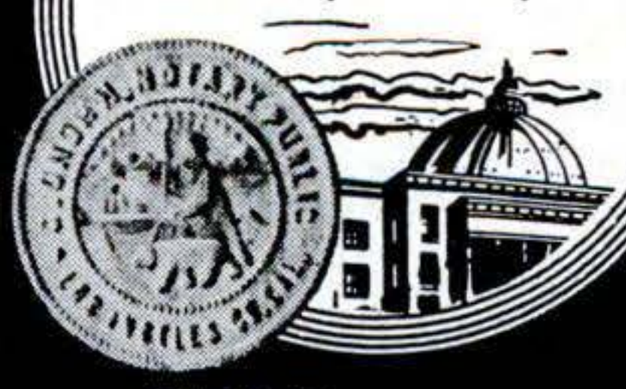
Copyrighted material

New **PROFIT-PROVEN*** Home-Business!

"I make $400.00 a week!"

*MAKE BIG MONEY, TOO—printing *without* a printing press! Learn the secrets of this new MIRACLE PRINTING METHOD . . . build a Big-Pay Business, SPARE or FULL-TIME, right in your *own home*. Never before has there been such a golden opportunity to turn *pennies* into *dollars in profit!* — to build a successful, prosperous future *easily, quickly,* and *enjoyably*—AT HOME!

***Proves**
Mr. J. T. Anderson,
Inglewood, Calif.
(Notarized statement on file in our office and open to inspection.)



and READ what others are saying about Screen Print

WHAT IS SCREEN PRINT? It's a new, fascinating technique—so amazingly simple and economical it may soon revolutionize the printing industry! Imagine—after only a few short days, you may print many beautiful professional job for LESS THAN IT WOULD COST ON A $5000 PRINTING PRESS!

SCREEN PRINTING IS FUN . . . EASY! If you like to work with your hands and make beautiful things, you'll find no Home Business that provides greater enjoyment, relaxation, and PROFIT. You'll enjoy every moment . . . creating beautiful printed material that may sell for really BIG MONEY!

NO EXPERIENCE OR COSTLY EQUIPMENT NEEDED! Few home businesses offer such BIG PROFITS for *so little* time, money, or training! You *don't* need art ability, expensive equipment, or previous experience! You start at home with little or NO OVERHEAD. Yet you can print—almost immediately—on PAPER, GLASS, LEATHER, CLOTH—ANYTHING! Work with all colors, even the vibrant new FLUORESCENT "Glow Colors" that are in such big demand in advertising circles! It's amazing—but true!

START SPARE TIME—ON A "SHOESTRING"! Use your spare time to earn up to $12.50 per hour, *right from the start.* Earn 2 INCOMES INSTEAD OF ONE. Print in your garage, basement, spare room—*anywhere!* Screen Printing requires little space—won't interfere with your household set-up. Later, when you see the TREMENDOUS PROFITS to be made, you may wish to make Screen Printing your full-time occupation. Become your own boss—make BIG MONEY! Others are doing it—why can't you?

HELP FILL THE HUGE, GROWING DEMAND! Businesses in every city, every community have learned —almost "overnight"— of the amazing quality and economy of MIRACLE Screen Printing! *You* save them up to 50% on many jobs—yet *you make up to 300% profit!* When the word gets around people *come to you*—no selling necessary! Because this sensational printing discovery is so new, many Screen Printers *sell exclusively by mail!*

WE SUPPLY EVERYTHING YOU NEED! Every secret, enough materials to start making money almost immediately can be yours! Never before has such a wonderful "profitunity" been offered to anyone desiring to start a profitable spare or full-time business of his own! We guide you every step of the way with our Personal Counseling Service & Home Business Plan . . . explain how we have helped others, and how we can help *you,* too! All the CONFIDENTIAL, money-making facts are yours if you MAIL COUPON today—while there's still time for you to get in on the ground floor!

"My first attempt at Screen Printing netted me $40.00."
J.R., Canada

"I would not take $1,000 for it right now. Just what I have been searching the world over for"—Mr. R.T., Florida

"Wonderful new method...made $80.00 first week...swamped with orders."
R.T., Florida

"Screen Printing is nothing less than fascinating"
S.M.D., Mass.

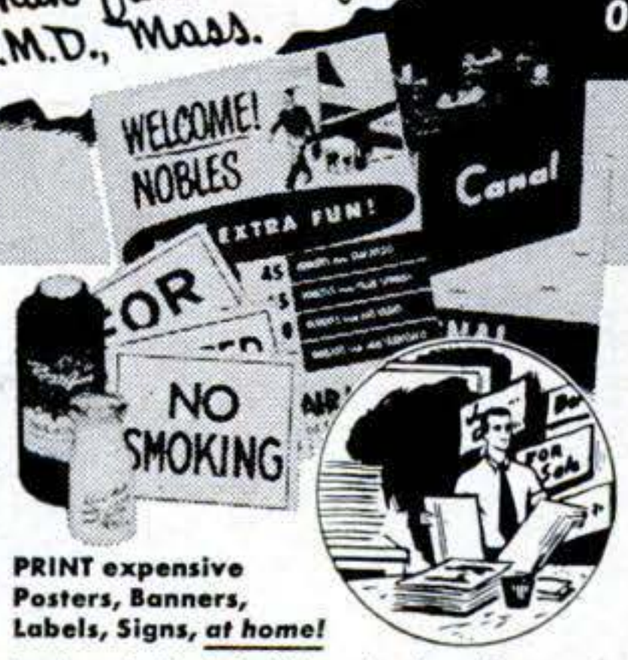
Copr. 1955

SCREEN PRINT
TRADE MARK REG.

PRINT WITHOUT A PRINTING PRESS!
OR ANY SPECIAL EQUIPMENT

Print Beautiful CLOTH, FABRICS, GLASS JARS, NOVELTIES, etc., *at home!*

MIRACLE Screen Print lets you print on *all* surfaces, all materials—*a big advantage* over regular print shops. You provide a service offered *only* by Screen Printers — may have the entire field to yourself!



PRINT expensive Posters, Banners, Labels, Signs, *at home!*

Realtors, Political Candidates, business firms, many are discovering that Screen Printing is the *best answer* to their needs. Be the first in your area to fill the huge demand!

PRINT Colorful ADVERTISING DISPLAYS *at home!*

Stores, markets, gas stations, theaters—all businesses need eye-catching displays. Ordinary printers simply can't compete, price-wise, with Screen Printers, on many jobs!

Free!

COMPLETE REVEALING DETAILS,
✓Authentic Samples, Proven
✓Big-Money Opportunity Plan,
Large Illustrated "How To" Booklet.

Screen Print Co., 15130 S. BROADWAY, LOS ANGELES 61, CALIF

Learn the Secrets-RUSH COUPON TODAY!

SCREEN PRINT CO., Dept. 1C
15127 S. Broadway, Los Angeles 61, Calif.

Gentlemen: Please mail me Free Revealing Details, samples, Opportunity Plan, etc.—All this is sent absolutey Free and sent to me by return mail. I am under no obligation now or ever.

Name _____

Address _____

City _____ **Zone** ____ **State** _____

Copyrighted material

DRAFTSMEN

CASH BIG PAY CHECKS!

Train Now for more success, greater security

LEARN AT HOME IN SPARE TIME
(or at college in Chicago)

Check the want ads in any newspaper—SEE the big-pay opportunities open to you as a draftsman. What's more, you can learn this well-paid, prestige profession at home—quickly, easily! No special talent needed. Get complete, step-by-step Chicago Tech lessons in the mail, spend a few pleasant hours studying each week. In a short time you'll be a well-trained draftsman, ready to take your pick of many good jobs. Act now!

FREE INFORMATION—MAIL COUPON TODAY!
Get FREE TRIAL LESSON plus information about C.T.C. practical training. Learn what successful Chicago Tech graduates say about high pay and opportunities in drafting. No charge, or obligation.

CHICAGO TECHNICAL COLLEGE

S-223 Tech Bldg., 2000 So. Michigan Ave.
Chicago 16, Illinois
Mail me FREE Lesson with information about big opportunities in DRAFTING.

Name.....Age.....

Address.....

City.....Zone....State.....

NEW! WORLD'S SMALLEST PRECISION SUPER POWER 2 Transistor Radio

- **Printed circuit with power pack.**
- **Plays instantly. No warm-up.**
- **"Impact-resistant" plastic case.**

Not a toy! Professionally engineered precision high-powered set, guaranteed to far out- perform any 1 transistor set. Tunes local broadcast stations with clear tone. No "ground" connections or cumbersome aerial wires. Features permeability tuning, diode detection, hermetically sealed transistors. Full size 2" x 3" x ¾". Smaller than a cigarette pack. Operates months on 2 pen cells. Plays anywhere; at beach, on boat, ball game or golf course. Lets you listen to programs in full privacy. Ideal for Civil Defense receiver. Exclusive #430 printed circuit with power pack shows many hook-ups.

Ideal Xmas Gift!

COMPLETE RADIO KIT $9.95 Ppd.

Exclusive 8,000 ohm hearing aid ear set $3.95 ppd.

Send only $1. Pay postman balance plus COD charges.

Eastern Audio Research Corp.
P.O. Box 2, Huntington Sta., N.Y.

SHORTHAND in 6 WEEKS

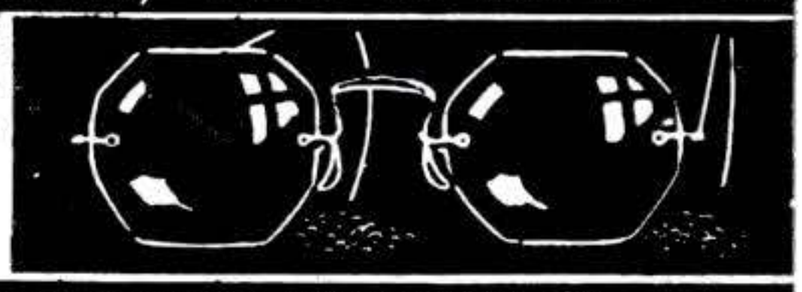
Famous SPEEDWRITING shorthand. 120 words per minute. No symbols; no machines; uses ABC's. Easiest to learn, write and transcribe. Lowest cost. 300,000 taught by mail. For business and Civil Service. Typing available. 33rd year. Write for FREE booklet to: **SCHOOL OF**

Speedwriting®
Dept. 2612-5, 55 W. 42 St., New York 36

EYE GLASSES by MAIL As low as $1.95

WRITE for FREE CATALOG with 14 LENS SAMPLE CARD

Thousands of Customers
Est. 1939



QUALITY READING-MAGNIFYING OR BIFOCAL GLASSES FOR FAR AND NEAR

ADVANCE SPECTACLE COMPANY, Inc.
537 S. Dearborn St., Dept. SP-12 Chicago 5, Illinois

BETTER JOB, BIGGER PAY

Learn How You Can Win A

●Today, choose the career you want and prepare for success during spare time at home. Or if you are in work you like best, start training at once for quick promotion and higher pay. For 59 years American School has helped many, many thousands of ambitious persons to make their dreams come true—important positions, high incomes, job security. List at right contains only a few of many big opportunities we offer.

For FREE career information, send us your name and address and tell us which opportunity subject you prefer. Do it TODAY.

- ☐ Accounting
- ☐ Architecture & Building
- ☐ Automotive Technician
- ☐ Bookkeeping
- ☐ Business Management
- ☐ Civil Engineering
- ☐ Drafting
- ☐ Electrical Engineering
- ☐ Electronics—Industrial
- ☐ High School Courses
- ☐ Mechanical Engineering
- ☐ Plumbing—Practical
- ☐ Private Secretary
- ☐ Salesmanship—Outside
- ☐ Sheet Metal Work

AMERICAN SCHOOL, Dept. G946, Drexel & 58th, Chicago 37, Ill.
Canadians: Write American School, 1610 Sherbrooke W., Montreal

BARBELLS

100 POUND SET $9.80

Extra Plates Only 10c Pound

140-Pound, CHROME DELUXE Barbell-Dumbbell set only **$16.80.** This is our feature set and is the finest ever manufactured.

Training with adjustable weight is the **BEST** way to keep fit; the **ONLY** way to develop great strength and a perfect body. As the oldest and best equipped barbell company, BUR gives value and prices no one can equal.

SEND FOR FREE CATALOG.
BUR BARBELL CO.
Lyndhurst 5, New Jersey

GROWING MIDGET TREES!

EARN EXTRA MONEY

AT HOME • SPARE TIME • FOR FUN AND PROFITS!

It's New! Amazing! FULL GROWN living dwarf trees—only 12 INCHES HIGH! Elm orange, oak, cypress—any kind! All BLOOM and even BEAR FRUIT. Perfect, healthy specimens, but miniature! Make costly home decorations and beautiful expensive centerpieces (sold for over $1,500 each). It's Fun! A new fascinating artistic HOBBY — a new $$$$$$ HOME BUSINESS! Real seed and sensational new growing plan details. BOTH ABSOLUTELY FREE!

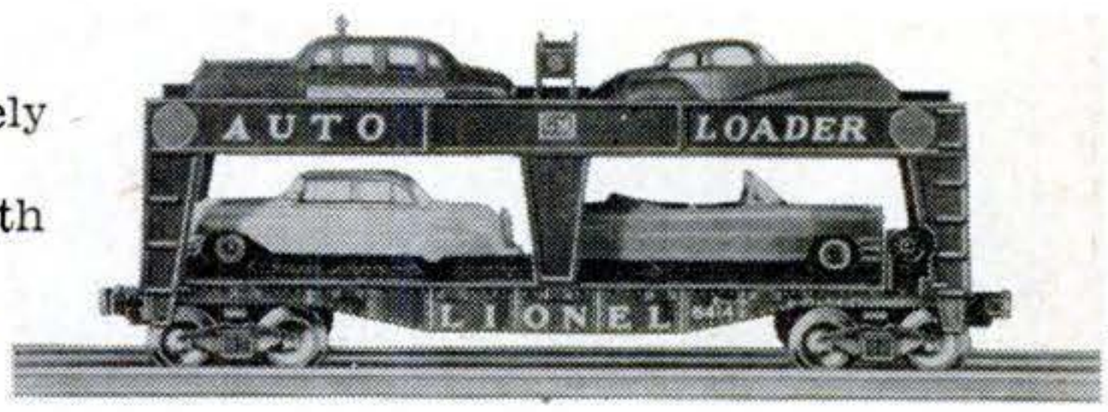
FREE! GENUINE SEED AND PLAN

NATIONAL NURSERY GARDENS, Dept. N-12
8463 SOUTH VAN NESS, INGLEWOOD 4, CALIFORNIA

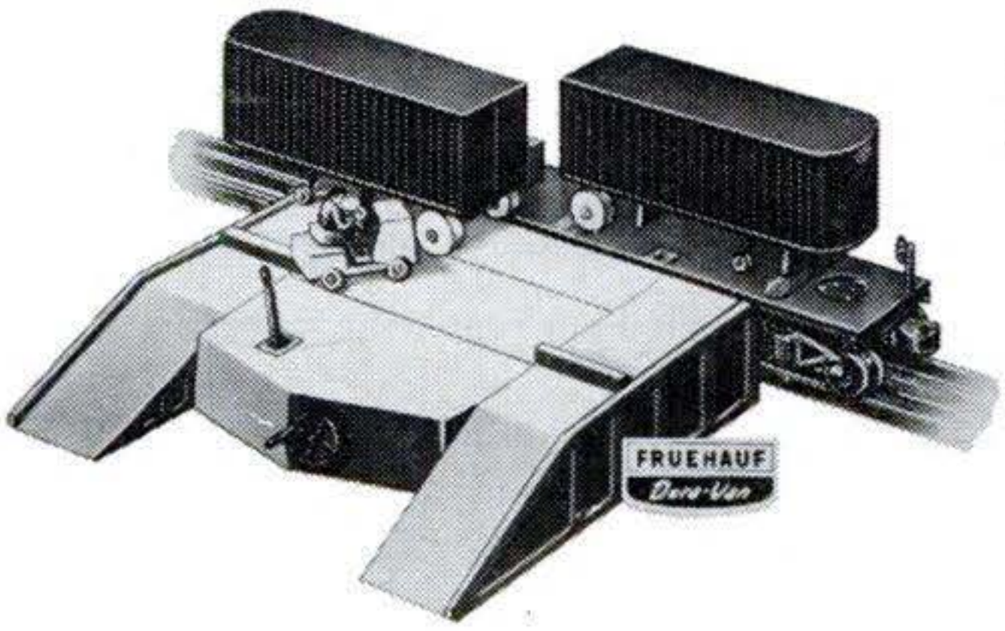
Copyrighted material

LIONEL® Train Sets and Accessories!

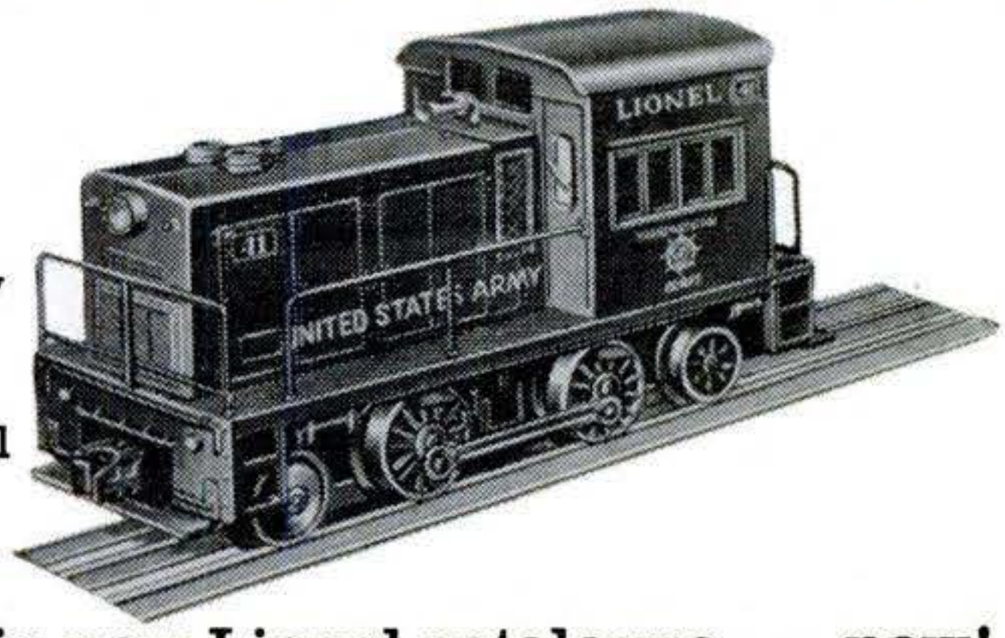
Only Lionel has Magne-Traction!



New! Auto Transport Car! No. 6414. Modelled accurately after the real Evans Auto Loader, which is just now making its appearance on big railroads! Bright-red with black and gold markings, it carries four minutely-detailed scale-model removable 1955 autos! Operating knuckle-type couplers. 11″ long.



New! Piggy Back Transportation Set! No. 460. Action! Action! MORE ACTION with this latest real-life R.R. innovation ... "piggy back" transportation! Scale-detailed truck vans can be cranked right on and off flat car! Flat car couples to any Lionel Train. Set includes platform, flat car and vans! Platform and ramps are 14″ long; platform is 5″ wide and 2″ high.



New! Gas Turbine Switcher! No. 41. Snappy looks! Snappy *action* for your yards! Exact model of gas switcher just built for U.S. Army! Amazing detail ... doors, stacks, air scoops, front and back simulated headlights. Regular Lionel 3-position control. Remote control couplers at both ends. For "0" and "027" gauges. Switcher measures 7½″ long.

See them at your Lionel dealer's and get his new Lionel catalogue . . . now!

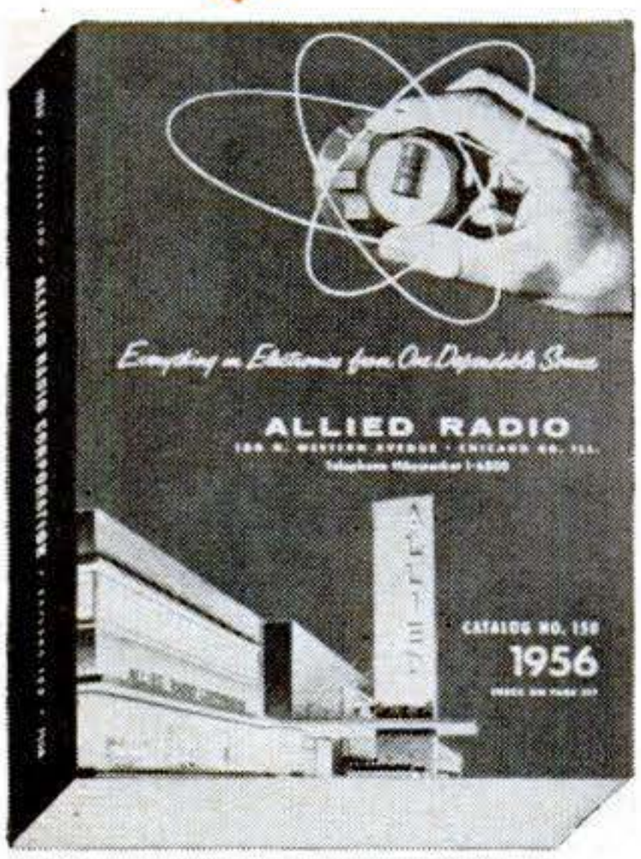
THE LIONEL CORP., 15 E. 26 STREET, NEW YORK 10, N. Y.

Copyrighted material

free!

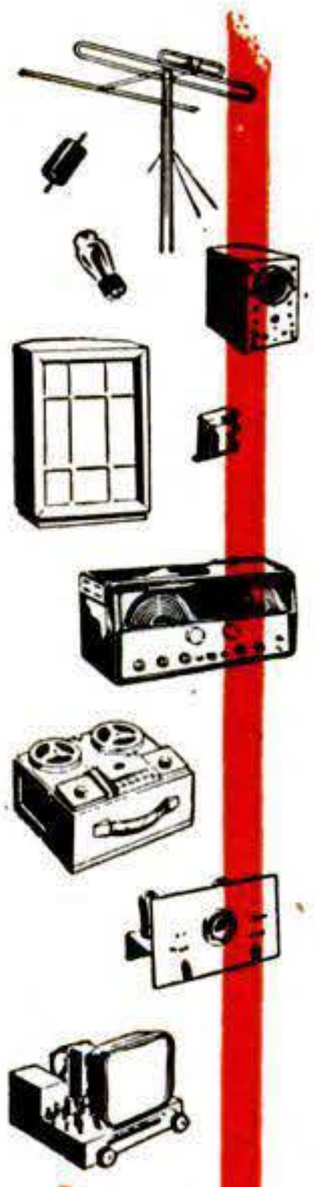
1956 ALLIED

ELECTRONIC SUPPLY CATALOG



324 value-packed pages

Save on Everything in TV and Radio Parts & Equipment



Everything for Experimenters, Builders, Amateurs, Servicemen, Engineers & Hi-Fi Specialists

Send for ALLIED's big 324-page value-packed guide to *everything* in TV, Radio and Electronics! Select from the world's largest stocks of High Fidelity systems and components; recorders and phono equipment; TV tubes, antennas and accessories; Amateur station equipment and supplies; P.A. systems; test instruments; latest build-your-own kits; industrial electronic supplies—plus *everything* in electronic parts, tubes, transistors, tools and books. Save on everything in Electronics—send today for your FREE 1956 ALLIED Catalog.

Everything in Electronics From One Reliable Source

send for it **FREE CATALOG**

ALLIED RADIO

ALLIED RADIO CORP., Dept. 7-M-5
100 N. Western Ave., Chicago 80, Ill.

☐ Rush FREE 1956 ALLIED 324-Page Catalog

Name _____

Address _____

City _____ *Zone* ____ *State* ____

Want to pass a U.S.

CIVIL SERVICE TEST?

MEN—WOMEN, 18-55. Thousands of positions open. Prepare NOW for next examinations. Write immediately for free 36-page book, with list of positions and particulars telling how to prepare. Grade school education often sufficient. Veterans get preference.

FRANKLIN INSTITUTE
(Not Government Controlled)
Dept. K-90, Rochester 4, N. Y.

make your own *Gems* **29.50 F.O.B**

The Gem Maker comes complete with all necessary equipment, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b. Burlington, Wisconsin. Write today for information and literature.

B & I MANUFACTURING CO.
Dept. S Burlington, Wis.

NOW—MAKE CERAMICS WITHOUT KILN

Make lovely vases, bowls, lamps, trays. No special skill or equipment needed. New Della Robbia Kit contains Miracle Clay, tools, brushes, 10 glaze colors, illus. instruction book. Clay bakes hard and durable in kitchen oven. Try kit 7 days. Only $5.95 postpaid. If not delighted return for full refund. Or send $1 for illustrated instruction book credited on purchases. SCULPTURE HOUSE, Dept. A1112, 304 W. 42nd St., N. Y. 36, N. Y.

WE NEED YOU!

C P UNITED CEREBRAL PALSY

Important News for Car Owners!

Make new Popular Science book, ALL ABOUT YOUR CAR, your 290-page car-repair authority. It's crammed with valuable, time-saving, money-saving pointers. Shows you how to locate, repair trouble, remodel, paint, save on gas, oil, etc. Your car will look better—run better—last longer. Send only $2.49! Popular Science, Dept. 1255, 353 4th Ave., N. Y., N. Y.

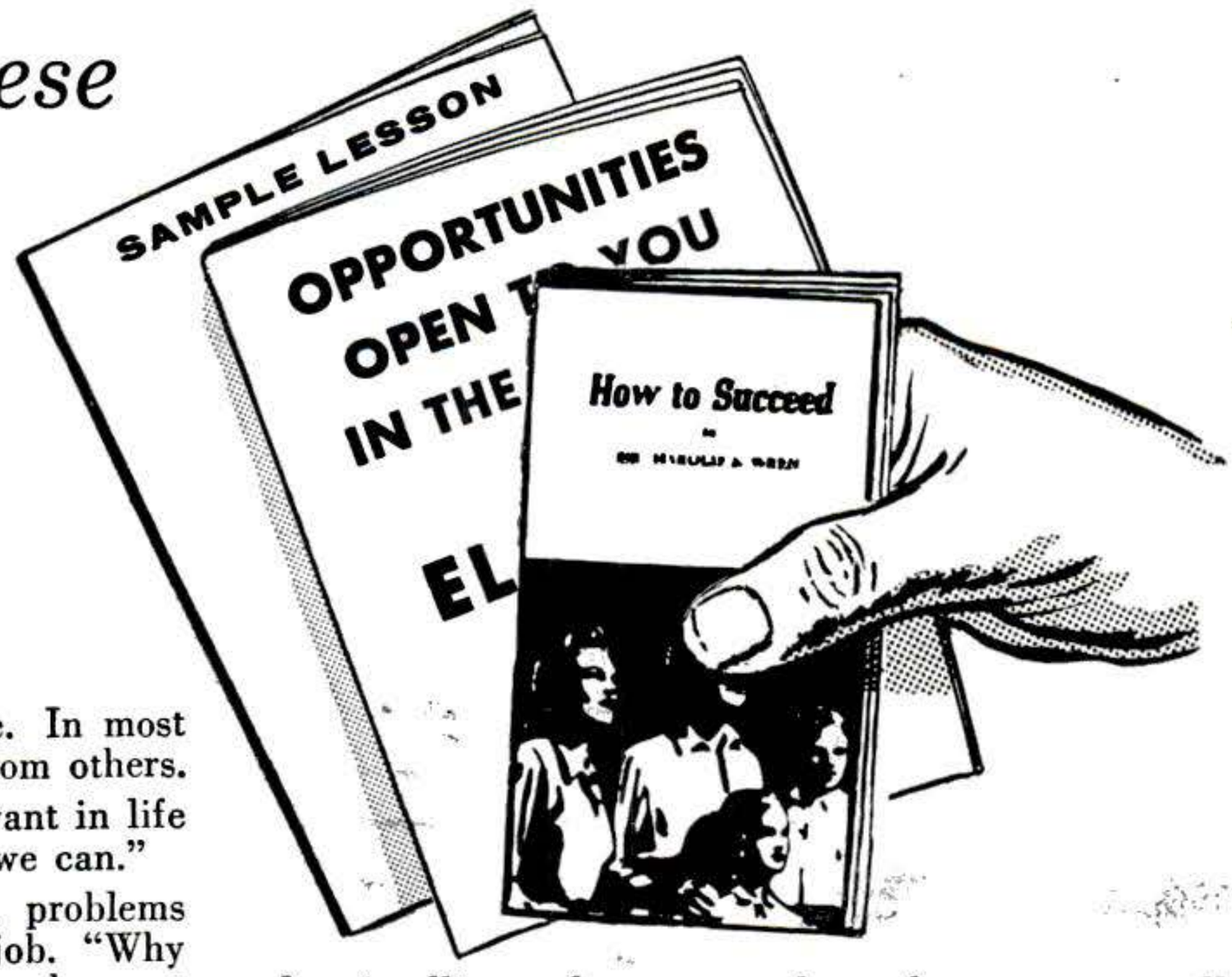
#7000

Copyrighted material

We will invest these

3 FREE BOOKS

in your future



Life's problems are never simple to solve. In most cases they require help and inspiration from others.

It was Emerson who said—"Our chief want in life is somebody who shall make us do what we can."

Perhaps one of today's most common problems has something to do with an individual's job. "Why can't I make more money?". . ."Will I be the next to be fired?". . ."Why are others promoted over me?" are some of the questions that plague most of us at some time or another.

If you wonder about *your* job security, about your future, here's help that is yours for the asking. Three FREE BOOKS—any one of which could change the course of your entire life.

Don't put it off. If you are really interested in succeeding, send for these three free books today. Remember, hesitation is one of the greatest causes of failure.

Book No. 1, "How to Succeed," is a gold mine of tips on how a hundred little things about you, your personality, your outlook on life can affect your future. It will help you discover hidden talents in yourself, it will show you how others—less educated, less intelligent than you, perhaps—have overcome all sorts of obstacles and have gone on to success.

Book No. 2 is a complete catalog that outlines opportunities in the field in which you are most interested. It gives you the facts on just what your chances are of succeeding in a given field.

Book No. 3 is a sample I. C. S. lesson text (Mathematics). Literally thousands and thousands of men and women of all ages have won promotions, pay raises, the respect of friends and community through I. C. S. training.

I. C. S. is the oldest and largest correspondence school. 277 courses. Business, industrial, engineering, academic, high school. One for you. Direct, job-related. Bedrock facts and theory plus practical application. Complete lesson and answer service. No skimping. Diploma to graduates.

For Real Job Security—Get an I. C. S. Diploma!

I. C. S., Scranton 9, Penna. Member, National Home Study Council

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS

BOX 25314M, SCRANTON 9, PENNA. (Partial list of 277 courses)

Without cost or obligation, send me "HOW to SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

ARCHITECTURE and BUILDING CONSTRUCTION
- ☐ Air Conditioning—Refrig.
- ☐ Architecture
- ☐ Architectural Interior
- ☐ Building Contractor
- ☐ Building Maintenance
- ☐ Carpenter and Mill Work
- ☐ Estimating
- ☐ Heating
- ☐ Painting Contractor
- ☐ Plumbing
- ☐ Reading Arch. Blueprints

ART
- ☐ Cartooning
- ☐ Commercial Art
- ☐ Fashion Illustrating
- ☐ Magazine Illustrating
- ☐ Show Card and Sign Lettering
- ☐ Sketching and Painting

AUTOMOTIVE
- ☐ Auto Body Rebuilding
- ☐ Auto Elec. Technician
- ☐ Auto-Engine Tune Up
- ☐ Automobile

AVIATION
- ☐ Aeronautical Engineering Jr.
- ☐ Aircraft & Engine Mechanic

BUSINESS
- ☐ Advertising
- ☐ Bookkeeping and Accounting
- ☐ Business Administration
- ☐ Business Correspondence
- ☐ Public Accounting
- ☐ Creative Salesmanship
- ☐ Federal Tax
- ☐ Letter-writing Improvement
- ☐ Office Management
- ☐ Professional Secretary
- ☐ Retail Business Management
- ☐ Sales Management
- ☐ Stenographic-Secretarial
- ☐ Traffic Management

CHEMISTRY
- ☐ Analytical Chemistry
- ☐ Chemical Engineering
- ☐ Chem. Lab. Technician
- ☐ General Chemistry
- ☐ Natural Gas Prod. & Trans.
- ☐ Petroleum Engineering
- ☐ Plastics
- ☐ Pulp and Paper Making

CIVIL, STRUCTURAL ENGINEERING
- ☐ Civil Engineering
- ☐ Construction Engineering
- ☐ Highway Engineering
- ☐ Reading Struct. Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Engineering
- ☐ Surveying and Mapping

DRAFTING
- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Mine Surveying and Mapping
- ☐ Plumbing Drawing and Estimating
- ☐ Structural Drafting

ELECTRICAL
- ☐ Electrical Engineering
- ☐ Electrical Maintenance
- ☐ Electrician ☐ Contracting
- ☐ Lineman

HIGH SCHOOL
- ☐ Commercial ☐ Good English
- ☐ High School Subjects
- ☐ Mathematics

LEADERSHIP
- ☐ Foremanship
- ☐ Industrial Supervision
- ☐ Leadership and Organization
- ☐ Personnel-Labor Relations

MECHANICAL AND SHOP
- ☐ Gas—Electric Welding
- ☐ Heat Treatment ☐ Metallurgy
- ☐ Industrial Engineering
- ☐ Industrial Instrumentation
- ☐ Industrial Supervision
- ☐ Internal Combustion Engines
- ☐ Machine Design-Drafting
- ☐ Machine Shop Inspection
- ☐ Machine Shop Practice
- ☐ Mechanical Engineering
- ☐ Quality Control
- ☐ Reading Shop Blueprints
- ☐ Refrigeration
- ☐ Sheet Metal Worker
- ☐ Tool Design ☐ Toolmaking

RADIO, TELEVISION
- ☐ Industrial Electronics
- ☐ Practical Radio TV Eng'r'ng
- ☐ Radio and TV Servicing
- ☐ Radio Operating
- ☐ Television Technician

RAILROAD
- ☐ Air Brakes ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Section Foreman

STEAM AND DIESEL POWER
- ☐ Combustion Engineering
- ☐ Diesel—Elec. ☐ Diesel Eng's
- ☐ Electric Light and Power
- ☐ Stationary Fireman
- ☐ Stationary Steam Engineering

TEXTILE
- ☐ Carding and Spinning
- ☐ Cotton, Rayon, Woolen Mfg.
- ☐ Finishing and Dyeing
- ☐ Loom Fixi'g ☐ Textile Des'ing
- ☐ Textile Eng'r'g ☐ Throwing
- ☐ Warping and Weaving

MISCELLANEOUS
- ☐ Domestic Refrigeration
- ☐ Marine Engineering
- ☐ Ocean Navigation
- ☐ Professional Engineering
- ☐ Short Story Writing
- ☐ Telephony

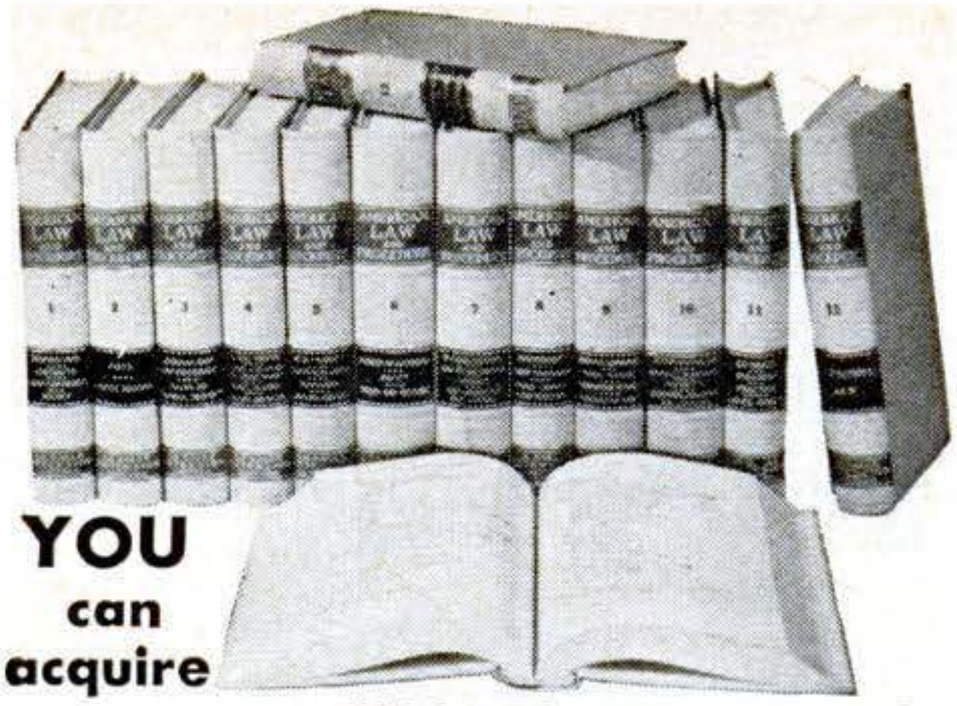
Name_____ Age_____ Home Address_____

City_____ Zone_____ State_____ Working Hours_____ A.M. to P.M._____

Occupation_____

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

Copyrighted material



YOU can acquire

LAW NIGHTS AT HOME! L L.B. DEGREE

LaSalle's famous Law Library—used as reference in many Law libraries and Law offices—has enabled thousands to master Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, simplified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalized Problem Method of instruction . . . you *learn by doing*—handling legal problems—not by memorizing rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and telling how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation.

LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution

417 S. Dearborn St. Dept. 1283-L Chicago 5, ILL.

Send me your two **FREE** booklets described above, without obligation.

Name ..... *Age* .....

Street .....

City, Zone & State .....

$35,000 REWARD FOR URANIUM

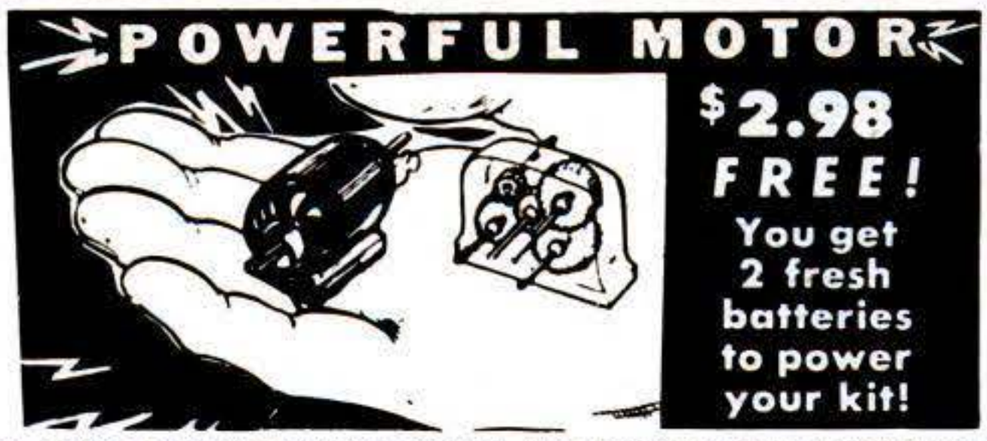
Here's your chance to "cash in!" Over $2,500,000 in Government Bonuses have been paid for URANIUM discoveries in the past 2 years. Currently $150,000 a month is paid to people just like you.

Precision Geiger Counters and Scintillators are the finest instruments made for URANIUM prospecting. These highly sensitive instruments are compact, lightweight and ruggedly built for field use. Prices start at $29.95.

CONTACT YOUR NEAREST DEALER or write direct to factory for FREE 12-PAGE CATALOG, describing URANIUM and Metal detectors.

PROSPECTORS RELY ON . . . PRI

PRECISION RADIATION INSTRUMENTS, INC.
4223 PS W. Jefferson Blvd., Los Angeles 16, Calif.
WORLD'S LARGEST MANUFACTURER OF RADIATION INSTRUMENTS



POWERFUL MOTOR

$2.98 FREE!
You get 2 fresh batteries to power your kit!

One of the smallest precision motors ever built yet does GIANT-SIZED JOBS. Drives Model Planes, Boats, Construction Sets, Working Models, Trains and Cars, etc., with amazing speed up to 6800 R.P.M. (or as little as 50 R.P.M.), using the reduction gears that come with this exciting set. This MIGHTY-MIDGET does hundreds of jobs. It's a Honey. Looks exactly like a Big Motor, yet measures 1"x1¼" and weighs one ounce. For only $2.98, YOU GET LOTS MORE with this Mighty Midget. You get a complete set of 5 gears and pulleys and a transparent multi-ratio gear box as well as a battery clip and instructions. NO SHOCKS, SPARKS, NO SHORTS, NO TRANSFORMER NEEDED. Reverses immediately, too! Endless hours of fun. Enclose check or money order for $2.98 for this entire set and we will pay postage. C.O.D. orders plus 45c postage.

CRAFT INDUSTRIES
520 FIFTH AVE. DEPT. M367 N. Y. 36, N. Y.

LOOK!

A MILLION THRILLS!
High Power
BINOCULARS
33 Models: $9.95 to $125
Free! Catalog & Book "How to Select Binoculars"
FREE TRIAL PLAN
BUSHNELL *Binoculars*
Dept. P12 43 E. Green Pasadena, Calif.

LEARN MODERN WATCH AND CLOCK REPAIRING

Complete Course—Only $5.95

At home, spare time. Good field now . . . security and contentment in future. Start part-time business and **EARN while you learn.** Horology is precision instrument work...a great and growing field, sensational opportunities. Easy self-instruction course. Full price, only $5.95. SEND NO MONEY. Just pay postman, plus C.O.D. postage. Or send $5.95 with order, we'll ship postpaid. Satisfaction guaranteed or refund. **NELSON-HALL CO., 210 S. Clinton St., Dept. 3MV-1, Chicago 6, Ill.**

INVENTORS

PREPARE AND FILE YOUR OWN INVENTIONS

Here is a book written for the amateur and professional inventor. Chapters include: How to Prepare and File Your Own Patent, What to Do After the Patent is Filed, Pitfalls and Rackets to Watch For, etc. Money back if not completely satisfied. Send $2.95, check or money order to:

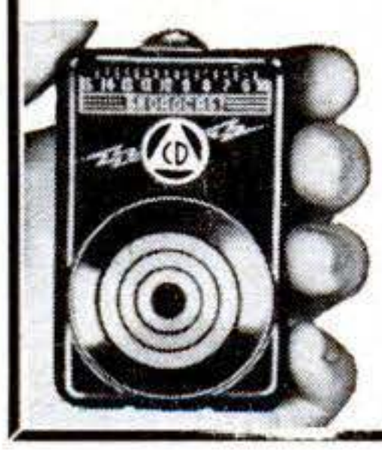
JOSEPH F. CALLEJA
1558 Newcomb Avenue San Francisco 24, Cal.

NOW! Practical Home Course in AUTOMATIC TRANSMISSION

FREE loan of automatic transmissions while you learn at home! Demand for specialists is terrific! Real big money in this field. Learn from experts in spare time. Easy to understand, illustrated lessons plus FREE use of Hydramatic, Dynaflow and Fordamatic transmissions. You can start making money. Send for FREE BOOKLET.

LINCOLN TECHNICAL INSTITUTE
Dept. PS-2, 472 Market St. Newark 5, N. J.

CIVIL DEFENSE POCKET SIZE RADIO



NO TUBES - - BATTERIES OR ELECTRIC PLUG-INS NEEDED!

Ordinary radios MAY BE USELESS DUE TO RUN DOWN BATTERIES OR POWER FAILURES during atomic attacks but this NEW CD Perma-Crystal Diode Pocket Radio operates during power blackouts. Receives regular radio stations and CIVIL DEFENSE BROADCASTS. Works anywhere when used as directed. COMPLETE SELF-CONTAINED SPEAKER PHONE. GUARANTEED TO WORK and should last for years. BE PREPARED—GET YOUR CD POCKET RADIO NOW!

SEND ONLY $1.00 (cash, ck, mo) and pay postman $4.99 COD POSTAGE or send $5.99 for postpaid delivery. COMPLETE READY TO PLAY WITH CIVIL DEFENSE INSTRUCTIONS. By mail from—

MIDWAY CO. Dept. CPS-12, KEARNEY, NEBR.

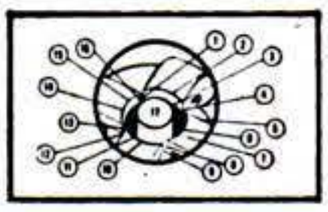
Copyrighted material

17 pt. Plug shows 11% fuel saving in stock American automobile!

New electrode system still fires clean, hot and steady past 50,000 car miles! You may now order a set of these remarkable LIFE-TIME spark plugs from this advertisement . . .

50,000 CAR MILES! Before LIFE-TIME development, the spark plug was the most often replaced part of your car. Engineers agreed that "creeping paralysis," gradual electrode disintegration, carbon buildup, widening gap, burning, blistering, insulator failure could waste one gallon in ten. The LIFE-TIME plug goes far beyond the life of the average set of tires, the average battery, firing clean, hot and steady at 50,000 car miles! Most spectacular spark plug research breakthrough in 50 years allows unprecedented warranty. WE GUARANTEE GREATER GAS MILEAGE—GREATER ACCELERATION—A MAJOR POWER INCREASE—OR YOUR MONEY BACK.

HOW 17 PT. FIRING WORKS



Note electrodes closely. A circular arcing area (four concave segments). Gap being the same from all points. Electricity has property of arcing from coldest point. Current also arcs more readily from apex of two planes than from face of a flat, metallic surface. Note that there are 16 apexes (where two planes meet) — all the same distance from the center electrode.

SPARK ROTATES AROUND CIRCLE. Normal heat and spark erosion are spread around the entire 360 degrees and around the whole circumference of the center electrode.

PLATONIUM-NICKEL ALLOY ELECTRODES— Metallurgists first major step beyond platinum aircraft plug electrodes. Arcing points of this material have continued to function after the equivalent of 120,000 car-miles.

SPECIAL SINTERED CORUNDUM INSULATOR— Made of gem-like mineral which conducts heat 20 times better than ordinary porcelain. Special shape (seen beneath electrodes) is designed to vaporize and exhaust wet carbon and oil.

INDIVIDUAL INSPECTION— Each LIFE-TIME Spark Plug is tested for firing in oil and for resistance to 30,000 volts/CM.

PERMANENT GAP— After months of use, LIFE-TIME Spark Plugs mike at exact factory pre-gap.

SELF-CLEANING FOR LIFE— Confined gases exploding in chamber formed by multiple electrodes reclean arcing surfaces with each firing stroke.

"THANKS FOR YOUR WONDERFUL LETTERS"

The real test of a spark plug is "What will it do in my own car?" Take the above dynamometer test on a 1951 Buick Super. It shows an 8 horsepower gain with Life-Time 17-point plugs. That was a 12½% hp gain at 2000 RPM. You don't need a dynamometer with Life-Time Plugs. You can feel the difference both in your ride and your pocketbook. Try a set and let me hear from you about them. Many Thanks.

Frank E. Williams
Inventor of the LIFE-TIME Spark Plug

CONTINENTAL MFG. CORP., CULVER CITY, CALIF.

NOW ORDER REGISTERED SET FOR YOUR CAR AT POPULAR PRICE!

this registered set of LIFE-TIME Spark Plugs in proper series (heat range and gap) for the car you indicate in coupon. NOW AVAILABLE FOR AMERICAN & EUROPEAN PASSENGER CARS, TRUCKS, BOATS, FARM EQUIPMENT, INDUSTRIAL ENGINES.

DEALERS AND DISTRIBUTORS — The LIFE-TIME Spark Plug is now in full production. Write for full details. Distributors: Please inquire as to status of your territory.

LIFE-TIME Spark Plug Division
CONTINENTAL MANUFACTURING CORP.
Washington Blvd. at Motor Ave., Culver City 116, California

Gentlemen: Please mail postpaid ____set(s) (registered) of LIFE-TIME Spark Plugs in proper heat range and gap for my car at $1.19 per plug (set of six, $7.14, set of eight, $9.52). (Or send $2 per set, balance C.O.D.) California residents add 3% tax.

Make of my car is_____year_____

Model_____No. cyl._____

I enclose $_____(check, cash or money order)

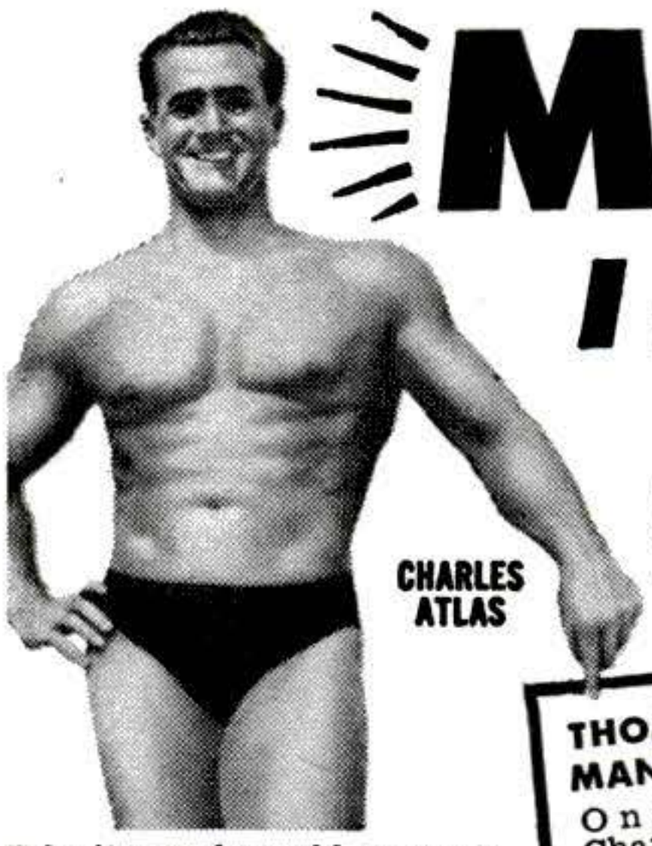
Name_____

Address_____

City_____Zone_____State_____

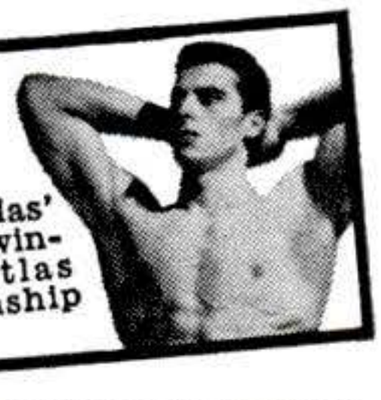
Copyrighted material

Here's the Kind of MEN I Build!



CHARLES ATLAS

Will You Let Me PROVE I Can Make YOU a New Man?



THOMAS MANFRE
One of Charles Atlas' pupils . . . winner of Atlas Championship Cup.

I don't care how old or young you are, or how ashamed of your present physical condition you may be. Just give me 15 minutes a day, and I'll start giving you RESULTS that you can SEE, FEEL, and MEASURE with a tape! I can broaden your shoulders, strengthen your back, develop your whole muscular system INSIDE and OUTSIDE! I can add inches to your chest. . . give you a vise-like grip. . . make your legs powerful . . . help cram your body so full of strength, red-blooded vitality your friends will be amazed! **WRITE FOR FREE BOOK.** 32 pages about how **"Dynamic Tension"** changed me from 97-lb. weakling into "World's Most Perfectly Developed Man"—and what I'll **prove** it can do for YOU. **CHARLES ATLAS Dept. 1-Z, 115 E. 23rd Street, New York 10, N. Y.**

CHARLES ATLAS, Dept. 1-Z,
115 East 23rd St., New York 10, N. Y.
Send me—absolutely FREE—a copy of your famous book, "Everlasting Health and Strength"—32 pages, crammed with photos and valuable advice. No obligation. (Please print)

Name_____ Age_____
Address_____
City_____ State_____

NEW PROJECTS FOR YOUR WORK-SHOP

Drawings, photographs and descriptions for

Tool Stands
Ornamental Posts
Railings
Barbecue Grills
Lawn Rollers
Golf Carts
Tools
Metal Furniture
Radiator Covers
Trailers
and others

Now so easy to build these yourself and save a lot of money

FILL OUT AND MAIL TODAY

The Lincoln Electric Company
Cleveland 17, Ohio • Dept. 3006
Attached is one dollar. Send my copy to:

Name_____
Address_____
City_____ Zone____ State_____

ARTHRITIS?

I have been wonderfully blessed in being restored to active life after being crippled in nearly every joint in my body and with muscular soreness from head to foot. I had Rheumatoid Arthritis and other forms of Rheumatism, hands deformed and my ankles were set.

Limited space prohibits telling you more here but if you will write me I will reply at once and tell you how I received this wonderful relief.

Mrs. Lela S. Wier
2805 Arbor Hills Drive—70
P. O. Box 2695 **Jackson 7, Mississippi**

BECOME AN EXPERT IN TRAFFIC

Traffic men earn $4,000 to $10,000 and up. Thousands of firms need experts on rates, tariffs, regulations. We train you thoroly in spare time at home for executive traffic jobs. Personal training under traffic authorities. Placement counsel and help. Write for free 48-page book "Traffic Management—the Fast Growing Profession."

LASALLE Extension University, 417 So. Dearborn St.
A Correspondence Institution Dept. 1283T Chicago 5, Ill.

MAKE BIG PAY OR OWN A BUSINESS

Learn AIR CONDITIONING AND REFRIGERATION

Play safe—choose your future in Air Conditioning, a billion-dollar industry that's growing every day. New CTI Shop-Method plan teaches installation and repair at home. **You get 23 practical training kits**—motor, compressor, gauges, controls, refrigeration hi-side, tools, supplies. You build an air conditioner, freezer, refrigerator or milk cooler. **Write today for FREE BOOK.**

COMMERCIAL TRADES INSTITUTE, Dept. R-125
1400 Greenleaf Ave. **Chicago 26, Illinois**

SEND FOR THIS FREE!

Make money. Know how to break and train horses. *Write today for this book FREE*, together with special offer of a course in Animal Breeding. If you are interested in Gaiting and Riding the saddle horse, check here ( ) *Do it today—now.*

BEERY SCHOOL OF HORSEMANSHIP
Dept. 5812 **Pleasant Hill, Ohio**

SAVE MONEY ON U S GOV'T SURPLUS

Buy surplus direct from US Government. These are samples of the savings that can be made. Life boat $12.00. Grinder $4.69. Shaper $15. Dump truck $76.77. Tractor $75.00. Typewriter $7.51. Freezer $50. Spray painter $15.25. Motor $4. Hunting, fishing, camping, sporting Equip, jeep, boat, tools. Hundreds others may be purchased at tremendous savings through our Bulletin "Surplus Sales." Price $1.00.
The Abacus Press, Box 169AAA, Dept. 5, East Htfd. 8, Conn.

TRAIN AT HOME
LEARN UNDERWATER Skin & Lung Diving

Only Home Training Course of its kind. Train for enjoying this great sport in safety or for good paying job opportunities. Home training program written by outstanding authority, E. R. Cross, Master Diver. Write asking for information about the Divemaster Home Training Program.

DIVEMASTER
U. A. S. Corporation **Dept. PS-12**
5637 West 63rd Place **Chicago 38, Ill.**

Copyrighted material

EARN BIG MONEY..WORK PART OR FULL TIME IN ELECTRIC APPLIANCE REPAIRING !

MILLIONS OF APPLIANCES NEED REPAIR!

ELECTRIC REFRIGERATORS
WASHING MACHINES
VACUUM CLEANERS
ELECTRIC RANGES
MOTORS
SEWING MACHINES
TOASTERS
WAFFLE IRONS
MANGLES
HEATING PADS
FREEZERS
ELECTRIC FANS
ELECTRIC IRONS
LAMPS
ETC., ETC.

ELECTRONIC KIT TROUBLE DETECTOR
(Checks shorts, wattage, continuity, etc.) is sent to all students

Learn this fascinating big money paying profession at home in your spare time. Learn by doing, by working with your hands building, testing, repairing electrical appliances of all kinds. Electrical appliance repairmen are needed everywhere—wherever electricity is used. You need no special previous training or experience. Age is no handicap. CHRISTY has trained over 33,000 men in all parts of the world. Men who today command big wages or own profitable businesses of their own.

PAY LATER FROM EARNINGS WHILE LEARNING

CHRISTY shows you how to make money while still learning, what to charge, how to set up your own shop, how to build power tools from spare parts, etc. It will pay you to write today.

MAIL COUPON for FREE BOOK

CHRISTY TRADE SCHOOL, Dept. D-5801
4804 N. Kedzie Ave., Chicago 25, Ill.
Send me your FREE book on Electrical Appliance Repairing and special form for "paying later from earnings made while learning."

NAME.....AGE.....
ADDRESS.....
CITY.....STATE.....

LEATHER BULL WHIP

Genuine 4-ply hand plaited leather whip with cracker tongue, loop grip. Pliable, heavy duty. **6-ft. Whip $1.98. 8-ft. Whip $2.69.**

JOHNSON SMITH CO.
Dept. 294 Detroit 7, Mich.

10-Shot Pellet Gun $1.65

Holds & shoots 10 pellets as fast as you pull trigger. Looks like big .45 cal. Colt automatic. Full size. 6½-in. long. Plastic moulded, moving parts die cast metal. **Gun $1.65 (Pellets 25c Pkge. Holster 50c).**

JOHNSON SMITH CO.
Dept. 294, Detroit 7, Mich.

Catalog OF 3000 Novelties 10c

Send 10c for amazing catalog of novelties, live animals, scientific supplies, hobbies, funmakers, planes & boats, looms, magic tricks, joke articles, unusual seeds, gadget timesavers, cameras, optical goods, projectors, movies, lucky jewelry, religious novelties, disguises, musical instruments, stamps, coins, puzzles, fortune tellers, radios, auto & bike accessories, telescopes, magnifiers, compasses, banks, smokers' gadgets, artists' supplies, printing sets, engines, motors, shockers, knives, billfolds, fireworks, guns, rifles, sports, books, games, plants, etc. Send name, address & 10c to:

JOHNSON SMITH & CO., Dept. 294 Detroit 7, Michigan

REAL OPERATING SUBMARINE

SUBMERGES . . . SURFACES . . . UNDER ITS OWN POWER

Of course you recognize it! It's the famed U.S.S. NAUTILUS . . . an accurately detailed, authentic scale model (fully half-a-yard long) of the world's first atomic submarine. This exciting sub model actually speeds along the water surface . . . submerges to periscope depth . . . then automatically resurfaces. Easy to assemble kit includes power unit and all prefabricated parts. A cinch to assemble! Only some lead ballast needed (available at any hardware store).

ONLY $1.98

Guaranteed to Work or Your Money Back

At Dealers or Order-By-Mail. Send $2.00 & we pay postage

SCIENTIFIC, Dept. PS1, 111 Monroe St., Newark 5, N. J.

DRAFTING DOUBLES YOUR INCOME FREE BOOK TELLS HOW

PAY AS YOU LEARN

You, too, can soon be cashing big pay checks and enjoying an assured future in industry. C.E.I.'s modern, practical courses are prepared especially for Home Study. A Professional Engineer will guide and train you . . . what's more, we help you get a job.

ADDITIONAL EXTRA TRAINING

IN CLEVELAND *AT NO EXTRA COST*

50 Hours of Specialized, Post-graduate training for two weeks at our Resident School.

VETERAN APPROVED

RECEIVE THIS SET OF INSTRUMENTS AT NO EXTRA COST

CLEVELAND ENGINEERING INSTITUTE

IT'S EASY — STUDY AT HOME IN YOUR SPARE TIME

Because of C.E.I. training, pay has increased and working conditions are more favorable. W.A.K.

After completing your course my salary increased to $820 per month. G.T.W.

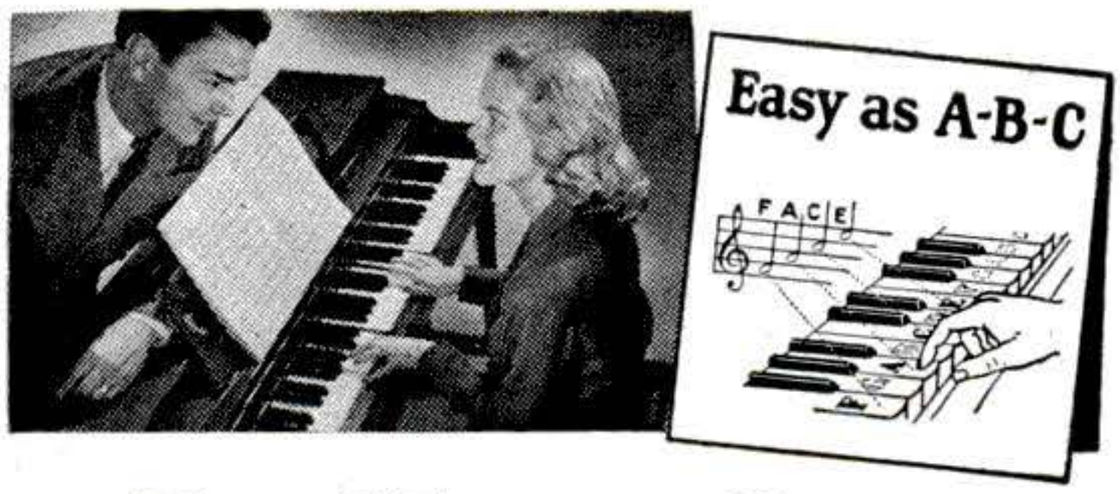
CLEVELAND ENGINEERING INSTITUTE
DEPT. PS12E
6300 Euclid Ave. — Cleveland 3, Ohio

☐ Aeronautical ☐ Mechanical

NAME ..... AGE .....
ADDRESS .....
CITY ..... STATE .....

No Obligation — No Salesmen

Copyrighted material



Be Your Own MUSIC Teacher

PLAY ANY INSTRUMENT

LEARN AT HOME THIS QUICK MONEY-SAVING WAY

Simple as A-B-C. Your lessons consist of real selections, instead of tiresome exercises. You read real notes—no "numbers" or trick music. Some of our 900,000 students are band LEADERS. Everything is in print and pictures. First you are told what to do. Then a picture shows you how. Then you play it yourself and hear how it sounds. Soon you are playing your favorite music.

STOP CHEATING YOURSELF OF THESE JOYS!

Popularity! New friends. Gay parties. Good times. Career. Extra Money. Understand, appreciate and converse about music. Learn lives and compositions of modern and great masters . . . Relax! Banish worries and frustrations. Satisfy self-expression, creative urge. Gain self-confidence.

Mail coupon for Free 36-page illustrated book. Mention your favorite instrument. **U. S. SCHOOL OF MUSIC, Studio A1512, Port Washington, N. Y.**

FREE BOOKLET

U. S. SCHOOL OF MUSIC, Studio A1512
Port Washington, N. Y.
Please send me your FREE 36-page illustrated book. I would like to play (Name Instrument).

Instrument..... Have you Instrument?.....

Name.....
(Print Name)

Address.....

MAKE $18.00 AN HOUR WITH New PLASTIC SANDWICH MACHINE

This new, remarkable PLASTIC SANDWICH MACHINE does a permanent, beautiful, professional, protective, plastic lamination job in exactly three minutes time! Amazing earnings possible in your own home or shop permanently sandwiching PHOTOS, SOCIAL SECURITY CARDS IDENTIFICATION CARDS, CLIPPINGS, DIPLOMAS, etc. between sheets of clear plastic.

Make PLASTIC SANDWICHES that cost you only 8c each, take 2-3 minutes time—yet sell for 50c to $1.00 each! Laminating machines range from $35.00 up.

FREE SAMPLE

and illustrated literature, NO obligation.

PLASTIC SANDWICH MACHINE CO.
6612 N. Clark St. Dept. LM-303 Chicago 26

REPAIR ANY WATCH

. . . Swiss or American

No previous experience needed to learn *modern watch repair*. An enjoyable hobby or profitable career. Unique Sweazey System starts you making repairs right away. Develops your skill step by step. Teaches you modern shop methods . . . *professional short cuts* . . . mistakes to avoid. Learn by *personal attendance* or spare time *home study*. Individual training. Start any time. *Free sample lesson*. No obligation. Write today!

CHICAGO SCHOOL OF WATCHMAKING
2330 N. Milwaukee, Dept. 4125, Chicago 47, Illinois
Founded 1908 • Approved for veterans

RUPTURED

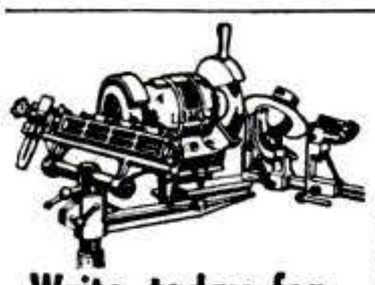
BE *FREE* FROM TRUSS SLAVERY

NOW there is a new modern **Non-Surgical** treatment that permanently corrects rupture. These **Non-Surgical** treatments are so certain, that a Lifetime Certificate of Assurance is given. Write today for our New FREE Book that gives facts that may save you painful and expensive surgery, and tells **how non-surgically** you may again work, live, play and love and enjoy life in the manner you desire. There is no obligation.
Excelsior Hernia Clinic Dept. 3705 Excelsior Springs, Mo.

UPHOLSTERY

BE YOUR OWN BOSS

Practical low-cost LEARN-BY-DOING Course, complete with tools, materials, frames, trains you quickly AT HOME in spare time. Start making money in Upholstery almost at once! Big FREE illustrated book and free sample lesson shows you how—gives full facts about business, job opportunities for men and women. Write TODAY! Also Resident Training. G.I. Approved.
UPHOLSTERY TRADES SCHOOL
Dept. DX-1609 721 Broadway, New York 3.



Write today for FREE BOOK

$5 CASH AN HOUR!

sharpening circular saws, planer and jointer knives in your home or garage . . . spare time. No experience needed. Hundreds of jobs in your neighborhood . . . no canvassing . . . no selling. Only $15 down brings you this money-maker. Write today to:

BELSAW MACHINERY CO, 1676 Field Bldg., Kansas City 11, Mo.

TASOPE PHOTO-ENGRAVING PLANTS

MATERIAL COST OF THIS CUT 3/4¢ SELLING PRICE $1.00 AND UP

Establish your own profitable PHOTO-ENGRAVING business. Make cuts for newspapers, printers, and advertisers. Make etched name plates, plaques etc. Instructions furnished, no experience necessary. Sold direct from factory since 1931. First five hundred cuts sold locally or by mail will pay for plant and pay you well for your time. Write for FREE catalog.

TASOPE, DEPT. PS-12, AURORA, MO.

"DO IT YOURSELF!"

SAVE ON SERVICE CALLS—
Test your own TV and Radio Tubes with the Home Service Tester

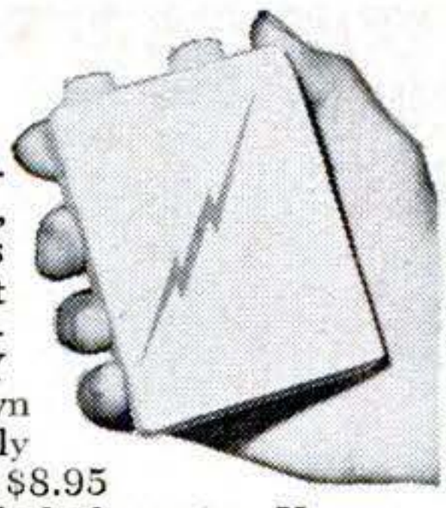
Also tests appliances for shorts and broken wires or elements, light bulbs, fuses, motors, flash bulbs and any other electrical equipment. Same tube tester now being used by over 25,000 TV and Radio Servicemen. Quick—shock-proof—no technical knowledge required. Save Money Now—by ordering TODAY! Satisfaction guaranteed or your money back. Complete with easy instructions.

$4.95 ea. postpaid

Lindaily Products 2626 W. 103rd Pl., Chicago 43, Ill. Dept. PS-12

Copyrighted material

NEW TRANSISTOR RADIO POCKET SIZE!



1956 MODEL uses latest HIGH-GAIN CIRCUIT. Ideal for office, home, hospital, or camp. Covers broadcast band. 20¢ batteries last months. No "substandard" transistors used. All parts FULLY GUARANTEED. Now you can own a PERSONAL RADIO for only $5.99 (kit with instructions) or $8.95 factory wired set only. Prices include batteries. Use any radio earphone or order high imp. hearing aid earset at only $3.95. C.O.D. orders accepted with $1 deposit. Precision Electronics, Dept. 6, Cupertino, California.

MARKSMAN AIR PISTOL

A hard-hitting, extra powerful air pistol that muzzle loads and cocks like a real .45 automatic. **All-metal** contruction gives weight and "feel" of real gun. Shoots .177 cal. BB's, pellets & darts with amazing accuracy. Set complete with 3 kinds ammo., targets, & guar. See your local dealer or write, Dept. E,

MORTON H. HARRIS, INC. 2050 WESTGATE AVE. LOS ANGELES 25, CAL.

LEARN METALCRAFT

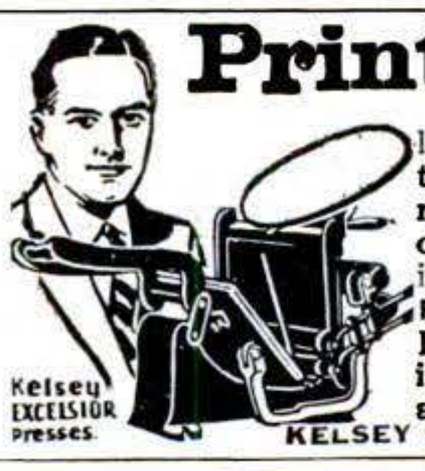
and JEWELRY MAKING

Low Cost Home Training Now Available

Make money. Learn profitable skills and arts of decorative metal and jewelry crafts. Course is complete. Professionally prepared. Easy to master. Special tools and materials furnished.

Write for Free Booklet **INTERSTATE TRAINING SERVICE** DEPT. K-2 PORTLAND 13, OREGON

Print Your Own



Cards, Stationery, Advertising, labels, circulars, photo and movie titles, church work, tags, etc. Save money. Sold direct from factory only. Raised printing like engraving, too. **Print for Others, Good Profit.** Have a home print shop. Easy rules supplied. Pays for itself in a short time. Write for free catalog of outfits and all details.

KELSEY PRESSES, N-33, Meriden, Conn.

SALE

15 X 65 Regularly $59.50 Save $10.00

Tremendous power. Brings objects 15 times closer! Wide field (65mm objective lens . . . almost 3" across)! Easy to hold—focus. 8½" x 9". **Exclusive** with UNITED. Regularly $59.50. **SALE PRICE FOR THIS SALE ONLY..... $49.50** including case, straps! Made in Japan. **USE 30 DAYS,** if not satisfied return for refund. **UNITED BINOCULAR CO., 9043 S. Western. Dept. ARF-2316, Chicago 20. DEALERS WANTED.**

Find a Fortune on vacation, hunting, fishing trips!

Pin-Point URANIUM with super-sensitive VIC-TIC GEIGER COUNTER

Free! Illus. Brochure on VIC-TIC, compl. line Mineralights, Scintillation Counters, Prospecting Books, Tubes.

First with "Miracle" Transistors! First with Self-Contained Speaker! World's finest, most advanced radiation detection field instrument! Four sensitivity ranges . . . no earphones to wear . . . weighs just 3 lbs. Literally *triples* your chances—detects deposits ordinary counters miss!

$125.00 *postpaid ($25 dep. req. on C.O.D.'s)*
Same day shipment. Money Back Guarantee.

ELECTRONIC INSTRUMENT CO., Dept. 3D
1035 Santa Barbara St., Santa Barbara, Calif.

I WILL TRAIN YOU FOR RADIO-TELEVISION ON MY EXCLUSIVE NO-OBLIGATION NO-RISK TRAINING PLAN

Frank L. Sprayberry, President

Let me prove to you . . . without cost or obligation . . . that I can prepare you to be a Radio-Television Serviceman in 10 Months or Less

Let the true facts speak for themselves! That's why I want you to have my big new catalog and an actual sample lesson of Sprayberry Training . . . both FREE! Read, then make up your own mind! Train on my exclusive NO OBLIGATION PLAN . . . which means *you DO NOT sign any kind of time payment contract.* You pay for and accept your training as fast or as slowly as you wish. Prepare now for big paying jobs in Radio-TV or your own business. I will help you earn while you learn . . . in spare hours at home.

Sprayberry Specially Engineered Television Training Receiver

New Sprayberry Oscilloscope

Get Practical Experience with 25 Kits of Radio-TV Parts

Practical experience counts most. In addition to modern lessons, you train with actual parts and equipment. Build the famous Sprayberry Training Television Set, Multi-Range Tester, 2-Band Radio, other Test Equipment—all yours to keep. Get latest training on Color TV, Transistors, Hi-Fi and UHF Conversions . . . included to make your training more valuable.

You owe it to yourself to get all the facts . . . Mail coupon for catalog and sample lesson — FREE

See for yourself . . . in actual pictures and descriptions . . . why Sprayberry Radio-Television Training offers *more.* Backed by almost 25 years of training experience. Three training plans to suit your exact needs. Rush coupon today for big new catalog and sample lesson. No obligation; *no salesman will call.*

TWO BIG FREE BOOKS

SPRAYBERRY ACADEMY OF RADIO
Dept. 55-F, 111 N. Canal St., Chicago 6, Ill.

Mail Coupon Today!

SPRAYBERRY ACADEMY OF RADIO
Dept. 55-F, 111 N. Canal St., Chicago 6, Ill.

Mail for FREE Facts and Sample Lesson

Please rush catalog on your ALL-NEW Radio-Television Training Plans. I understand this does not obligate me and that *no salesman will call.* Include Sample Lesson FREE.

Name_____ Age____

Address_____

City_____ Zone____ State____

Copyrighted material

NOW COYNE TRAINS YOU IN SPARE TIME AT HOME

TELEVISION
RADIO-ELECTRONICS

Only from famous COYNE do you get this modern up-to-the-minute TV Home Training. Easy to follow, Step-by Step instructions—fully illustrated with 2150 photos and diagrams. Not an old Radio Course with Television tacked on. Personal guidance by Coyne Staff. So practical you can quickly EARN MONEY IN A TV-RADIO SALES AND SERVICE BUSINESS—**part time or full time.** Not only FINEST TRAINING but COSTS MUCH LESS—pay *only for training—no costly extras.*

SEND COUPON FOR FREE BOOK

SEND COUPON BELOW for Free Book and full details including EASY PAYMENT PLAN. NO COST OR OBLIGATION—NO SALESMAN WILL CALL.

B.W. COOKE
President

COYNE ELECTRICAL SCHOOL — **FOUNDED 1899**

A TECHNICAL TRADE INSTITUTE OPERATED NOT FOR PROFIT
500 S. Paulina Dept. 95-HT3 Chicago 12, Illinois

B.W. COOKE, President
COYNE ELECTRICAL SCHOOL
500 So. Paulina St., Chicago 12, Ill., Dept. 95-HT3

Send FREE Book and details of your Television-Radio-Electronics Home Training offer.

Name.....

Address.....

City.....State.....

I'll Send You This Handsome SAMPLE CASE—FREE!

Make up to $30.00 in a Day!

Your Own Tailored Suits Without 1¢ Cost

If you want to make more money, spare time or full time, rush the coupon below today for this big, valuable tailoring Sample Case packed with 150 beautiful, big-value suit and overcoat samples. Just show the samples and last-minute styles to friends, fellow-workers, others. Take their orders for fine made-to-measure clothes—and pocket BIG CASH PROFITS in advance. No experience, no tailoring knowledge needed—and no money needed, ever. WE SUPPLY EVERYTHING FREE... sample case, sample suitings, equipment, complete instructions. Start making money first day!

Use Spare Evenings... Weekends... Make Money... Get Suits!

It's easy to make money taking orders in just spare time—lunch-time, evenings, weekends. When men see the fine fit, quality and value of our suits—THEY ORDER! So we make it easy for you to get your own personal suits and overcoats without paying even one penny. Don't wait! Rush coupon with your name, address, and age for FREE Sample Case.

J. C. FIELD & SON, Dept. K-1720
Harrison & Throop Streets, Chicago 7, Ill.

J. C. FIELD & SON, Dept. K-1720
Harrison & Throop Sts., Chicago 7, Ill.

Please rush ABSOLUTELY FREE the valuable Sample Case with suit fabrics and style display. Include instructions, money-making plans and details for getting my own suits without paying one cent.

Name.....*Age*.....

Address.....

City.....*State*.....

WELD YOUR WAY AHEAD!

Learn Arc and Gas Welding In Spare Time

Your opportunities are greater when you learn to use this great tool of modern industry. Training in welding opens the door to many key industries. Now you can train at home with UEI's practical course. Includes techniques, metallurgy, blueprints, shop practices, other important phases.

Write For FREE Facts! You can follow home-study training with actual shop practice. High school diploma not necessary. Write NOW!

UTILITIES ENGINEERING INSTITUTE
2523 Sheffield Ave., Dept. WM-5, Chicago 14, Ill.

MEN PAST 40

Men afflicted with Bladder Trouble, Getting Up Nights, Pains in Back, Hips, Legs, Nervousness, Dizziness, Physical Inability and General Impotency send for our amazing **FREE BOOK** that tells how you may correct these conditions and have new health and Zest in Life. Write today. No Obligation.

Excelsior Institute, Dept. B-5, Excelsior Springs, Mo.

STAMMERING

may be overcome by re-education of vocal muscles and speech mechanism. Scientific Home Method for adults and children by EX-STAMMERER based on physiology of speech leads to FLUENT SPEECH.

Write: **Dept. PS-3, VOCAL METHODS**
P.O. Box 5123 San Antonio, Texas

BUY IT **WHOLESALE!**

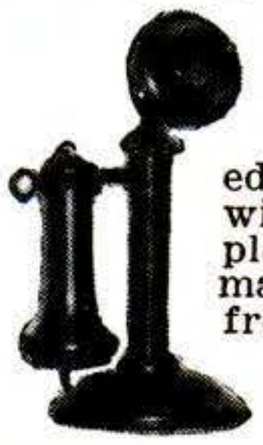
GET UP TO 40% OFF

☆ Start a Buying Service at Home, SPARETIME. GET BIG-NAME MERCHANDISE FOR SELF AND CLIENTS UP TO 40% LESS THAN REG. PRICE. SALES EASY, AS YOU CAN GIVE SIZEABLE DISCOUNTS, STILL MAKE FAT COMMISSIONS. *Post Card brings FREE COPY "The Wholesale Plan".*

FREE! "THE WHOLESALE PLAN"

American Buyers Service

HERTEL STATION, DEPT. PS BUFFALO 16, N. Y.



$2.95 EACH OR 2 FOR $5.00!

Genuine Telephone Company Upright Telephones, complete with cords, in tested and guaranteed condition with 50 ft. of wire, intercommunication instructions. Complete line of telephones and parts, dial, magneto, intercommunication, etc. Write for free list. All shipments F.O.B. Simpson, Pa.

TELEPHONE ENGINEERING CO.
Dept. 12A5 Simpson, Pa.

FREE! SEND FOR MY NEW PLAN FOR A **BUSINESS OF YOUR OWN!**

METALIZE BABY SHOES

Add to your present income or have a full-time business. Fill huge demand for most precious keepsakes. Start at once—no big investment. Complete instructions include *all* processing methods. It's fun and very profitable. Start now — SEND NO MONEY — just name and address.

KIKTAVI CO., Dept. S-5512, 11029 S. Vermont, Los Angeles 44, Cal.

•Instructions Include Complete Kit of Supplies & Beautiful BRONZED BABY SHOE

Copyrighted material

EARN BIG PROFITS In Your Spare Time!

If you have a little space in a SPARE ROOM, PORCH, BASEMENT, GARAGE ... ANYWHERE. Investigate this "chance of a lifetime" opportunity of breeding rare tropical fish for profit. The tropical fish "BOOM" IS JUST BEGINNING and here's your opportunity to cash in on it now. Experts estimate $780 MILLION DOLLARS will be spent on tropical fish within next ten years. Investigate now—Rush coupon below.

Join others that are saying: "Business prospects amazing," J. K., Ga. "Dealers want all I can breed," J. P., Ore. "Pays off large dividends," R. D., N. Y., etc.

1 and 2 (BOTH) FREE! MAIL THIS COUPON BELOW TODAY!

IT'S EASY! Once you know the SECRETS you may breed exotic ANGEL FISH; Zebra striped DANIO; beautiful GOURAMI; majestic FIGHTING FISH; the mysterious weather predicters—and BRILLIANTLY BEAUTIFUL rare tropicals of every kind. Sell for up to $35.00 pr. *Amazing Profits!*

SOME TROPICAL FISH LAY TO 600 EGGS AT A TIME. That's why tropical fish breeding is so profitable. Nature multiplies your $$.

This advertisement is an.....

URGENT APPEAL OPPORTUNITY

Orders backlogged in many areas. RUSH coupon NOW!

TROPICAL FISH BREEDERS OF AMERICA, Dept. C-12 15121 S. Broadway Los Angeles 61, Cal.

1 "How to Learn Breeding Secrets" Booklet.
2 VUER-PROJECTOR KIT With COLOR slides ($4.95 value) Yours FREE for writing for FACTS.

Tropical Fish Breeders of America, Dept. C-12
15121 S. Broadway, Los Angeles 61, Calif.
Please Rush FREE COLORFUL BOOKLET and amazing VUER-PROJECTOR KIT details to me. Both Free! Sending for these does not obligate me in any way.

Name _____ Age ____
Address _____
City _____ Zone ____ State _____

BUILD YOUR OWN **MIDGET ROADSTER $25** BUILDS BODY & FRAME

BUILD A PONY ROADSTER or Pick-Up in few spare hours. Uses 2 hp engine, 450 lb. loads, 70 m.p.gal., plenty of speed. Designed for **VERY LOW-COST** assembly from **PARTS BOUGHT IN YOUR NEIGHBORHOOD.** Use home tools. Great for kids, sturdy utility car. **COMPLETE** step-by-step plans, 17 large-size pages, 30 "show-how" photos. Body templates, complete material and parts-list. **ONLY $1.95 POST-PAID.** Satisfied or money back.

PONY PLANS, DEPT. 3C, 7641 TEXHOMA AVE., NORTHRIDGE, CALIF.

GIVE HIM SAFETY CLIPS FOR HIS CAR TOP CARRIER

LOCKS 1" AND SMALLER STRAPS TO CAR OR USE WITH TURNBUCKLES. GIFT PACKAGE SET OF FOUR $3.00

Mail cash or money order—10 day money back guar.

OWENS ENTERPRISE 4023 ZENITH AVE. SO. MINNEAPOLIS 10, MINN.

ELECTRIFY your SEWING MACHINE

NEW LOW PRICE! **$9.95** 90 DAY GUARANTEE

Buy direct from manufacturer and save! Kit comes fully wired, installed in a jiffy. Fits all machines! You get **ALL-NEW PARTS**

- Motor & Bracket • AC-DC 115v 60c • Mu.t.-speed foot control • Cord set & block • Easy instructions • Steel pulley & belt

ONE MONTH SPECIAL: Reg $7.95 Pinking Shears Only $1.00 with kit!

10 Day Free Trial—Order Now! **Free**—Reg. $2.95 Sewlite given with kit! Send no money, pay COD or send money order and we'll pay postage. Please state whether wheel on your machine turns toward you or away from you. Shipping wt. 6 lbs.

SENIOR SEWING MACHINE CO.

Box 142 Dept. PS03 Brooklyn 6, N. Y.

Buy and Hold

U.S. Defense Bonds

"Building Beautifiers" Can Earn High Incomes

Colorcrete, a cementitious plastic, gives lifetime beauty and protection to drab, dirty masonry — concrete, stucco, etc. — on all kinds of buildings. Tough, tenacious, enduring. Easily cleaned. Helps to daylight dark interiors. Choice of gleaming white or 30 colors. Applied under pneumatic pressure to form an inseparable bond.

More Colorcretors are needed to supply the ever-increasing demand. Low investment appeals to men of limited capital. Work is easy, fascinating, highly profitable. Broad opportunity to develop a lifetime business. No special ability or experience needed because we supply full instructions and sales cooperation. Colorcrete machine is simple to operate, easy to move around. Write today for Opportunity Book.

Colorcrete Industries, Inc. COLORCRETE C9
572 Ottawa Av., Holland, Mich.
IN CANADA: DUNN MASONRY MACHINERY LIMITED
1022 Dundas Highway Cooksville, Ont.

Copyrighted material

HOW TO REPAIR Electric Appliances

ASK TO SEE IT!

This HANDY, Practical "How to Do It" book for Electric & Gas Home Appliance Servicemen, Mechanics & Users covers Principles, Servicing & Repairs. Tells How to Locate Troubles, How to take Appliances Apart, How to Make Repairs, How to Assemble and Connect. Gives up to date testing methods, wiring diagrams and complete data on each appliance.

SAVE TIME, TROUBLE, MONEY WITH AUDELS BIG 800 PAGE HOME APPLIANCE SERVICE GUIDE

Toasters—Pressing Irons—Waffle Bakers—Casseroles—Roasters—Broilers—Coffee Makers—Space Heaters—Water Heaters—Ranges—Home Wiring—Shop Work—Appliance Testing—Fundamental Electricity—Fractional H.P. Motors—Food Mixers—Fans & Blowers—Vacuum Cleaners—Washing Machines—Clothes Dryers—Ironers—Dishwashers—Garbage Disposers—Refrigeration—Window Air Conditioners—Oil Burners—Drainage Pumps—Gas Ranges, Furnaces & Water Heaters—Bottled Gas Appliances.

A SHOP COMPANION THAT ANSWERS YOUR QUESTIONS. Easy to read and understand—over 800 pages fully illustrated—with 500 photos and diagrams—1001 Facts. A ready reference.

$4 COMPLETE • PAY $1 A MONTH

TO GET THIS SERVICE INFORMATION FOR YOURSELF—FILL IN AND MAIL 7 DAY TRIAL COUPON TODAY.

AUDEL, Publishers, 49 W. 23rd St., New York 10, N. Y.

Mail AUDELS HOME APPLIANCE SERVICE GUIDE ($4) for free examination. If O.K. I will send you $1 in 7 days; then remit $1 monthly until $4 is paid. Otherwise, I will return book promptly.

Name_____

Address_____

Occupation_____

Employed by_____ S12

NEW! PERSONAL POCKET RADIO

LISTEN WHILE YOU WALK, RIDE, WORK!

Slips in any pocket—Wt. only 9 ozs. Size 2¾" x 4¾" x 1⅛". Beautiful Black Gold plastic case. NO HOOKUPS—NO WIRES—NO PLUG-INS! Self contained with 150 hour life flashlite batteries. (Available anywhere) and BUILT-IN ANTENNA!

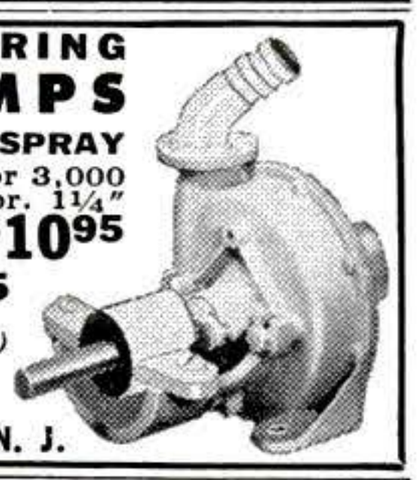
GUARANTEED RECEPTION OF RADIO STATIONS TO 50 miles—up to 1500 miles for powerful stations! Has new Patented Super-regenerative Duotriode tube and transformer audio stages for sharp selectivity and sensitivity! Easy to use top controls (while walking). Almost invisible plastic foam personal earplug lets you **alone** listen while you walk, visit, work, ride or sleep—anytime—anywhere. Money Back guarantee—1 year service guarantee.

SEND ONLY $5.00 (Ck, Mo) and pay postman $14.95 plus postage on delivery or send $19.95 for postpaid delivery. Get YOUR Tinytone REAL pocket radio now and be ready to listen to Civil Defense alarms, news, music, sports, etc. on a moment's notice. Not a Kit or plaything! Shipped complete with batteries—Ready to listen! Order now—today.

WESTERN RADIO Dept. APS-12 Kearney, Nebraska

EXCLUSIVE DOUBLE-BEARING

HEAVY DUTY PUMPS



IRRIGATE - DRAIN - CIRCULATE - SPRAY

Up to 7,500 GPH; 1,000 GPH 60' high; or 3,000 GPH from 25' well. Use ¼ to 1 HP motor. 1¼" inlet; 1" outlet. Stainless shaft. **TYPE X—** 2 oil-less bronze bearings. Won't rust. **$10.95**

TYPE XB—Ball bearing model. Best for belt drives..... **$12.95**

Postpaid if cash with order. (West of Miss. add 50c)

MONEY BACK GUARANTEE

Centrifugal and Gear Pumps in All Sizes

LABAWCO PUMPS Belle Mead 4A, N. J.

FREE! 60 APPROVED EXERCISES, 68 PHOTOS with **FAMOUS DAN LURIE**

BARBELLS

50 lb. set $ 8.48	150 lb. set $20.48
100 lb. set $13.98	200 lb. set $25.98

SEND FOR FREE CATALOG

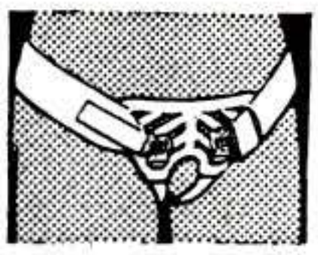
Order by mail—50% with order Balance COD. Extra WTS. 13c lb. FOB Plant.

DAN LURIE BARBELL CO.

52-S12 Bristol St., Dept. 570M, Brooklyn 12, N.Y.

SEE DAN ON T V "BIG TOP" SHOW

FREE BOOK



ON RUPTURE CARE

Contains much helpful information. Shows how thousands have been helped by the comfortable, safe WEB Truss. Write today to:

WEB TRUSS CO. Dept. PS-12 HAGERSTOWN, MD.

Build your own GAS TURBINE ENGINE!

Order these plans today

GAS TURBINE ENGINES. Two engines in one plan. Quick easy to make. No special tools, material. Instructions and seventeen sheets drawings, complete $9.95 C.O.D. We pay C.O.D. postage. Or send money and we will also include drawings of patent automobile turbine engine. Money back ten day guarantee Get other information too. Write, "Ship C.O.D." Print name. Rush order.

J. HOUSTON MAUPIN, Dept. 68, Tipp City, Ohio

When Writing to Advertisers

Please Mention Popular Science

INVEST YOUR TIME AS YOU WOULD YOUR MONEY

You don't waste your money. Don't waste your time either. Use it to better your future.

L. C. Lane, B.S., M.A.
President, National Home Study School

HIGH SCHOOL COURSES *AT HOME*

Complete 4-year course in 2 years or less

You don't have to give up your job or social life. Study in spare time with textbooks and modern study aids I send you.

Special Bookkeeping, Commercial, Mathematics, Agriculture, Industrial courses also offered.

Full credit for any high school work completed elsewhere. Start where you left off.

*You get standard textbooks, Study Guides, and these **Modern Study Aids** — projector and filmstrips, phonograph and records, complete science laboratory kits.*

NATIONAL HOME STUDY SCHOOL

50 East 19th Street, New York 3, N. Y.

Chartered by Board of Regents, University of State of N. Y.

Licensed by the State of New York

Send today for my new FREE catalog and sample Home Study Lesson

MAIL THIS COUPON TODAY!

NO SALESMAN WILL CALL!

Mr. Leonard C. Lane, President
NATIONAL HOME STUDY SCHOOL
Dept. NL-12, 50 East 19th Street, New York 3, N. Y.

Dear Mr. Lane: Please send your new FREE CATALOG with information on High School and special Job-Training courses and FREE SAMPLE LESSON. I understand I am not obligated and no salesman will call.

Print Name_____ Age____

Address_____

City_____ Zone____ State____

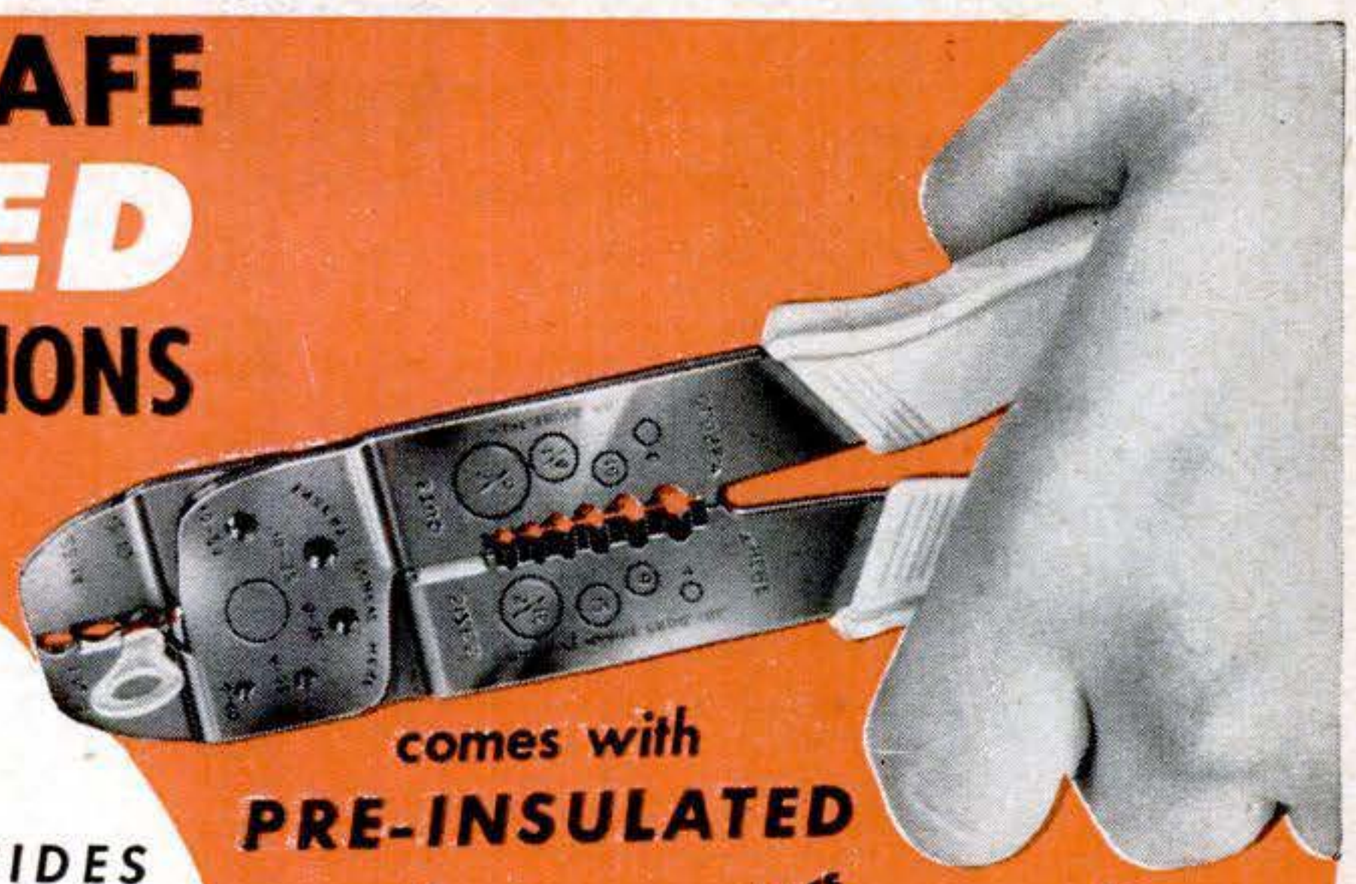
FIREARMS & SWORDS

You don't want to miss our new thrill-packed catalog. Fascinating background and illustrations of 1800 authentic pieces. Exceptional values in hard-to-find items. For your 175 page catalog #29 simply send 50c to cover postage and handling with your name and address.

ROBERT ABELS, Box PS, 860 Lexington Ave., New York 21, N. Y.

Copyrighted material

Make SURE, SAFE INSULATED ELECTRICAL CONNECTIONS



The New SUPER CHAMP Hand Tool

The ONE Tool for ALL Wire Sizes used in Home Wiring, Appliances, Automobiles.

DOES ALL THESE THINGS BESIDES

CRIMPS Solderless Terminals and Connectors without solder or tape for safe connections.

CUTS Wire, making clean, sharp cut through Insulation and Conductor.

STRIPS Wire sizes #22-#10. Gauges assure proper length for sure, safe crimp.

SHEARS Bolts and screws without damaging threads — no filing or hack sawing.

comes with PRE-INSULATED

FREE with Each TOOL

ORDER DIRECT – USE COUPON

Only $3.95 Post Paid

Satisfaction guaranteed or money back.
Send check or money order for $3.95.
(Ohio residents add 12c sales tax.)

T. W. Berger, Inc.
National Distributor Consumers and Dealers
AIRCRAFT-MARINE PRODUCTS, Inc.
1319-D American Bldg., Cincinnati 2, Ohio

T. W. Berger, Inc.
National Distributor Champ Tool
1319-D American Bldg., Cincinnati 2, Ohio
Send me post paid the new super Champ Hand Tool. I am enclosing $3.95. *(Ohio residents add 12c sales tax.)*

☐ check ☐ money order

NAME .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

FAMILY SAFE, PARTIALLY USED TIRES. Check my Golden Rule Guarantee! "The BLATT NAME famous in tires for 40 years". Only BLATT offers a "FREE REPLACEMENT" guarantee! Any other guarantee is USELESS where you must pay for the months service you've received. I replace FREE instantly ANY defective tire within 36 mos.

If you buy 2 or more 4-ply regular black TIRES you get an extra tire FREE!

CHOOSE YOUR FAVORITE BRAND GOODYEAR Firestone U.S., Goodrich, Lee and others.

These are not Recaps—not cheap grade tires. We are selling thousands in our retail store at higher prices! America's most respected "Free Replacement"
36 MONTH GUARANTEE & A FREE TUBE WITH EACH TIRE

600-16 $5.53	670-15 $5.43	700-20 $9.83	600-16(6) $5.93
650-16 5.63	710-15 5.43	750-20 11.83	650-16(6) 6.63
700-16 6.03	760-15 5.73	825-20 17.93	700-16(6) 7.33
640-15 4.83	800-15 5.83	900-20 17.93	700-15(6) 7.83
700-15 $4.93	820-15 $5.83	1000-20 $17.93	700-17 $8.83
600-20 9.03	650-20 9 83	1100-20 17.93	750-16 7.53
WHITEWALLS $1.00 extra		1000-22 19.93	750-17 9.93

GIVE A TIRE for XMAS FREE This pictured tire Ash Tray given with 2 or more tires!

SPECIAL! TIRES RELEASED BY CO ADJUSTERS! If a tire fails in 36 months, I charge you nothing. Just slightly used. Any car size. World's top tire value. (Whitewalls $1 extra.) Free tube with each tire. $7.53

GOODYEAR SUBURBANITE type & others—any car. Factory retreads & partially used. 30 mos. guar. & free tube. $7.27 SNOW-TIRES

MARVIN BLATT 609 Spring Garden St. Philadelphia, Pa.

MILITARY MUD-GRIP TIRES

AA Guar. 20 Mos.		AAA 38 Months	
900-16	$9.53	900-16	$13.93
750-20	12.93	750-20	17.33

Send Check or M.O. & this ad for instant shipment. FOB Phila. I personally select your tires—as if my future depended on it. Thousands of tires shipped the world over. Read that top line again.

Get into.. PLASTIC LAMINATING AT HOME!

THIS MAN . .
. . . is taking out of the machine a Plastic Sealing Job — ordered by mail — only 11c in material cost brings back $2.58 in cash by mail. Capacity of machine: **$25.00 profit per hour of operation.**

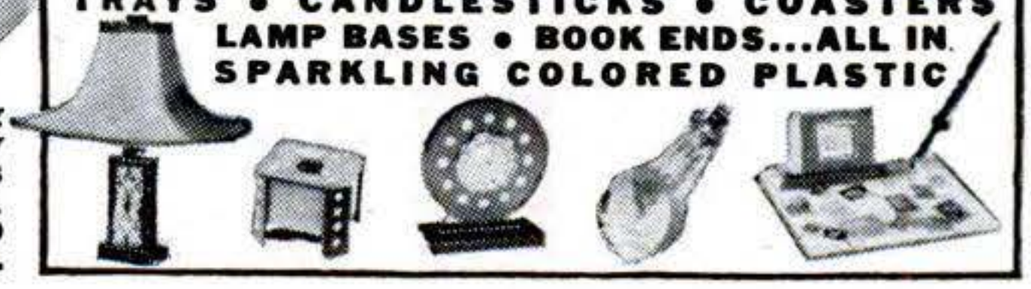
Get ORDERS and CASH from your mailman—do work in SPARE TIME at home —or expand into FULL TIME business.
Send coupon for Free facts about the newest and most fascinating of all home operated businesses. For the first time a simplified machine brings the fabulous profits of **Plastic Sealing** and **Plastic Laminating** within the reach of the small operator. Anyone can learn to operate the machine with a few minutes practice—then with our **Magic Mail Plan** can get mail orders pouring in daily with cash in every envelope. ***No canvassing—no selling.*** We even supply the circulars you mail to bring back cash and orders. Don't waste a minute. Rush your name. We'll send you FREE and postpaid, pictures, prices, details, and all the facts you need to start. Mail coupon or send name on postcard. No charge.

Make $20 to $30 a Day by.. MAGIC MAIL PLAN!

Warner Electric Co., 1512 Jarvis Av., Dept. L-9-P, Chicago 26, Illinois

Make Thousands of Beautiful Art Creations

COSTUME JEWELRY • CIGARETTE BOXES. TRAYS • CANDLESTICKS • COASTERS LAMP BASES • BOOK ENDS...ALL IN SPARKLING COLORED PLASTIC



WARNER ELECTRIC CO., 1512 Jarvis Av.
Dept. L-9-P, Chicago 26, Ill.
At no cost to me, please rush complete details postage prepaid. I am under no obligation.

Name.....

Address.....

City..... *Zone*..... *State*.....

Copyrighted material

DIESEL-AUTO MECHANICS NEEDED BIG PAY...GOOD FUTURE

If you have no trade or profession that assures you steady employment and top pay through good times or bad, regardless of whether you want to be a mechanic, technician, salesman, executive—or have your own profitable shop—you should investigate NOW this opportunity to enter world-famous Bailey Diesel Schools. Prepare yourself, *this proven way*, for an important place in the vast and ever growing field of Diesel, with TOP PAY . . . ASSURED FUTURE.

Why Gamble With Your Future!

Your future success depends largely on the reputation of the school you attend. Don't take chances! Train at Bailey—America's foremost school of Diesel Training . . . approved for veterans and non-veterans. We help you find part time jobs while in school. Employment after graduation. Return coupon below TODAY for FREE CATALOG that takes you on an amazing Camera Tour of Bailey Class Rooms and Shops.

ACT NOW—MAIL TODAY!

Name_____

Address_____

Town_____ State_____

BAILEY TECH. SCHOOLS
1652 So. Grand Blvd., St. Louis 4, Mo.

FREE 1956 CATALOG

WORLD RADIO LABORATORIES

"The World's Largest Distributor of Amateur Radio Equipment"

Jam packed with bargains — everything in Radio, TV, and Hi Fi — for Handyman, Ham, Experimenter or Serviceman!

- Pay Only 10% Down
- Easy Terms
- Liberal Trade-Ins
- Save Over 50% on Recond. Equipment
- Over 800 Guaranteed Reconditioned Items

WORLD RADIO LABORATORIES
3415 W. Broadway — Council Bluffs, Iowa
Leo I. Meyerson PERSONALIZED SERVICE

MAIL HANDY COUPON

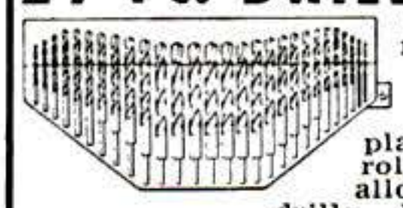
WORLD RADIO LABORATORIES, INC. PS-12
3415 W. Broadway — Council Bluffs, Iowa
☐ Free 1956 Catalog ☐ Recond. Eqp't. List
☐ 3'x4' U. S. Radio Map 25c

NAME_____

ADDRESS_____

CITY_____ STATE_____

CHROME VANADIUM 29 Pc. DRILL SET



Specially made for speed drilling. In sturdy plastic tool roll. Finest alloy steel drills hardened and precision ground to the sharpest, longest lasting cutting edge obtainable; will easily and cleanly bite through hardwoods, plastics, aluminum, iron and the toughest steels. Unconditionally guaranteed for thousands of drillings. Full jobber length. Sizes by 64th from 1/16 to 1/2" NOW..... $6.49 ppd.

Also available with Turned Down Shanks to fit all 1/4" drills. In individual pocket roll..... $8.95 ppd.

60 Pc. Set Wire Gauge CHROME VANADIUM DRILLS

Top quality high test Chrome Vanadium Drills designed for speed drilling through toughest steels, woods, plastic, iron and aluminum. Precision ground, long-lasting cutting edges. Guaranteed to give years of satisfaction. A full 60 pc set nos. 1 through 60.

A $14.95 value —NOW ONLY..... $5.35 plus 25c pp. & hdlg.

Same set above available with Huot Metal Index container—Only..... $6.35 plus 25c pp. & hdlg.

Send Check or M.O. C.O.D. fee extra. MONEY BACK GUARANTEE

SCOTT-MITCHELL HOUSE, INC., Dept. DR-5, 611 Broadway, New York 12, N. Y.

LEARN PLASTICS

COMPLETE LOW COST SHOP METHOD HOME TRAINING NOW AVAILABLE

Get in on Big Money opportunities in Plastic molding, casting, forming, carving, etc. Earn as you learn with Interstate's professionally prepared course. All plastic materials furnished.

WRITE FOR FREE BOOKLET

INTERSTATE TRAINING SERVICE
DEPT. C-2, PORTLAND 13, OREGON

MASTER MIND!

Learn Short-Cut Mathematics

Juggle figures, do baffling number tricks. Make people gasp at your marvelous *lightning-quick* mind. Multiply 4 figures by 4 figures without using old-fashioned multiplication! Big cloth-bound volume: fully illustrated course for self-instruction.

Sharpen up Your Brain Power

Includes worked-out problems, answers, etc. Sensational bargain, only $2.95, postpaid or COD plus postage. Satisfaction guaranteed or refund. Order this amazing "Short-Cut Mathematics" today!

NELSON-HALL CO., 210 S. Clinton St. Chicago 6, Ill.
Dept. 4MV-1

$2.95 Complete

STOP RADIO & TV NOISES INSTANTLY

NEW PATENTED ELECTRONIC INVENTION "CLEAR TONE" filter eliminates noisy interferences caused by all motor appliances, autos, oil burners, etc. Simply plug radio or TV cord into filter and filter into wall socket. Enjoy "CLEAR TONE" reception. Try 5 days—MONEY BACK GUARANTEE. SEND 10c for postage, handling.
Household Prod., Dept. 20, Scarsdale, N. Y.

FREE—Amazing Book on

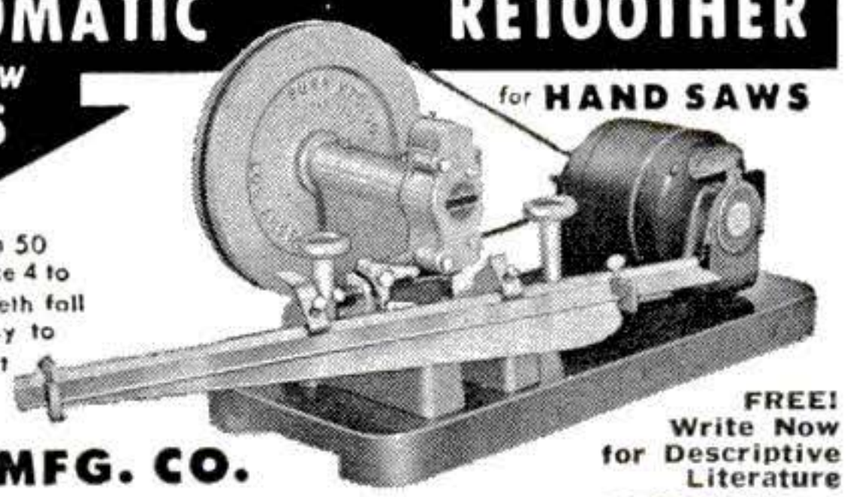
RHEUMATISM, ARTHRITIS

If you suffer the aches, pains and discomforts of Rheumatism, as manifested in ARTHRITIS, NEURITIS, SCIATICA or LUMBAGO, send today for the FREE Book. It reveals important facts about why drugs and medicine give only temporary relief without removing causes. Explains fully a proven, specialized system of treatment that may save you years of distress. No obligation. Write for this FREE Book today!

BALL CLINIC, Dept. 36, Excelsior Springs, Mo.

AUTOMATIC RETOOTHER for HAND SAWS

MAKES NEW PROFITS



Cuts new teeth in 50 seconds — any size 4 to 16 points. Old teeth fall off as chips. Easy to operate. A perfect job

FREE! Write Now for Descriptive Literature

BURR MFG. CO.
8943-P VENICE BLVD. LOS ANGELES 34, CALIFORNIA

Copyrighted material

LEARN MEAT CUTTING AT NATIONAL

Pay After Graduation

The steady dependable trade of Meat Cutting taught easily in 8 short weeks. You LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience. Get a Profitable store of your own. Remember, PEOPLE MUST EAT! Big pay jobs. Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, selling, etc. A complete retail meat education. National School established over 30 years. Get National training NOW. Pay your tuition in easy weekly payments after you graduate. Get all the facts. Send coupon for FREE 52 page school catalog—TODAY. G.I. Approved.

National School of Meat Cutting, Inc.
Dept. 51-Y, Toledo 4, Ohio

Send me your FREE school catalog on National Training at Toledo in Meat Cutting, Meat Merchandising and Self Service Meats. No obligation. No salesman will call.

Name.....Age.....

Address.....

City.....State.....

Approved for training Korean Veterans

OUTLAWED HITLER JUGEND DAGGER... $5.95 PPD.

Identical to pre-1939 official ceremonial dagger of Hitler's Youth (Jugend) Corps. Assembled post World War II, now illegal in Germany. The legendary Hitler Jugend carried this knife when the desperate Nazi government threw thousands of these fanatic youths into the battle of Berlin. 9½" overall with a fine steel blade. Checkered black grip has Nazi swastika (black on silver) on red and white diamond, the German Jugend insignia. A small lot found by our agent, was imported by us from Europe. Sheaths are black steel and leather. A rare collector's find, an excellent hunting knife. Send check, cash or money order. No C.O.D.'s. Add 80c per knife for U.S. A.P.O. or F.P.O. air mail. Calif. residents add 3% state tax.

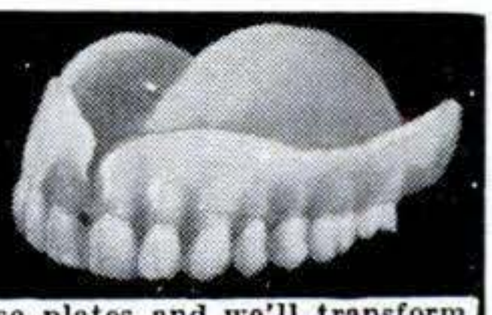
COMPLETE WITH SHEATH

The Swordsman

92 Armory Bldg., 1165 E. Colorado St. Pasadena 1, Calif.

NEW FALSE PLATE

FROM YOUR OLD ONE IN 18 HOURS



AS LOW AS $14.95

Send us your old broken, cracked or loose plates and we'll transform them into new lightweight wonder plastic plates. NO IMPRESSIONS needed with our revolutionary method. We use your own old plates. We remake them completely in only 18 hours. Missing teeth carefully matched and replaced. We GUARANTEE TO SATISFY YOU OR REFUND YOUR MONEY.

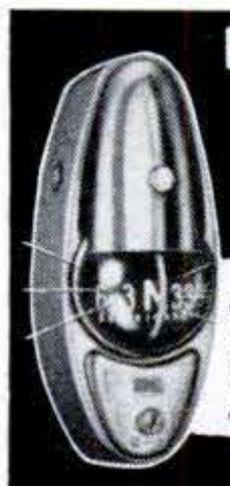
SEND NO MONEY—Send us your name today and we'll RUSH COMPLETE DETAILS. Begin to enjoy life right now. Clip this Ad; save it and send for free facts.

CHICAGO DENTAL PLATE LABORATORY • Dept PS-12
30 N. Dearborn St. • Suite 807 • Chicago 2, Ill.

---

best fitted for your car

HULL AUTO COMPASS



Your car interior possesses magnetic interferences unlike any other. Because Hull Auto Compasses have far the most positive means of compensating against such interference, they are best fitted to give YOU accurate, dependable directions.

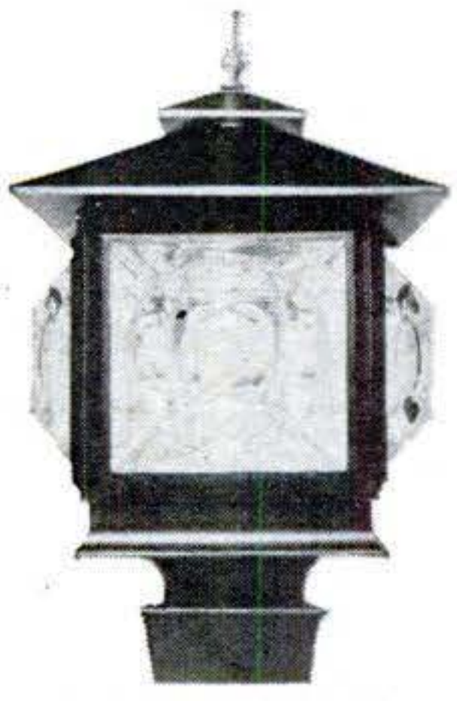
Beaconlite® ILLUMINATED $6.95
STREAMLINE NON-ILLUMINATED $4.95

NOW ALSO IN NEW CAR COLORS
At better dealers everywhere.
Write for literature.

HULL MFG. CO. P. O. Box 246-E12, Warren, Ohio

POST LAMPS

SAVE $25.00



Colonial: 18x10x10 delivered postpaid only $13.95

Ranch: 16x12x12 delivered postpaid only $12.95

DO IT WITH DOOLEY!

Don't do it yourself; do it with me! Lots of good buys and good ideas for home workshops.

These Post Lamps would retail for near $40. Cast aluminum, machine-fitted, ready to assemble and install. UL approved sockets. Hinged lids. Complete, easy-to-follow instructions included.

FREE CATALOG
Projects, Power & Hand Tools, Hinges Latches, etc.

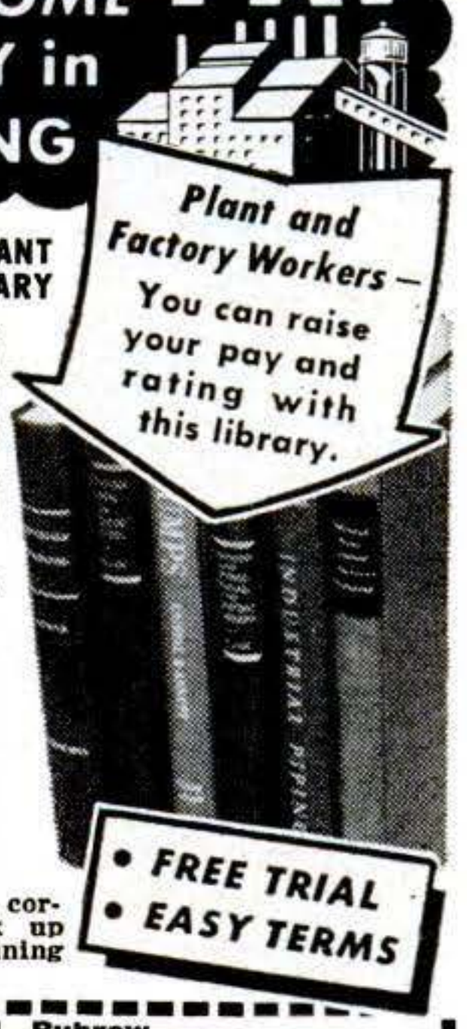
SAVE TODAY!

Dooley **2350 Curry Street** **P125**
Long Beach 5, California

Please print your name, address and order here.
Send Cash, Check or M. O. (no C.O.D.'s)

Copyrighted material

YOUR chance for BIGGER TAKE HOME PAY and OPPORTUNITY in PLANT ENGINEERING



GET PAY-BOOSTING KNOW-HOW ON PLANT EQUIPMENT AND CONTROLS FROM THIS LIBRARY

To keep production moving, industry pays big for men who can keep plant equipment in shape, materials moving, control devices and systems working. You can build these "in demand" skills—move ahead in plant engineering—by backing up your work with the ideas and methods in this library.

PLANT ENGINEERS' LIBRARY

- 6 Vols.
- 2479 pp.
- 1825 illus.

SAVE $7.50

Bought separately books cost $44.00. Low Library price of $36.50 saves you $7.50.

Library includes:

● Materials Handling ● Maintenance Manual of Electronic Control ● Pumps ● Instrument and Control Manual for Operating Engineers ● Industrial Piping ● Industrial Waste Treatment

This library helps you handle plant engineering operations quickly and efficiently—selecting, operating, and repairing electronic controls, pumps and piping, etc. Also covers materials handling, industrial wastes, instruments and controls. Helps you prevent costly breakdowns, correct faults quickly, back up production with smooth-running facilities.

McGRAW-HILL. Attn: H. Buhrow
Industrial & Business Book Dept. PS-12
327 West 41st Street, New York 36, N. Y.
Send me for 10 days' FREE EXAMINATION the Plant Engineers' Library. In 10 days I will send $6.50, plus small delivery costs, then $6.00 a month until $36.50 is paid. Otherwise I will return books postpaid.
(PRINT)

Name.....
Address.....
City.....Zone....State.....
Employed by PS-12

☐ **WE'LL PAY DELIVERY** if you remit (check or M.O.) with coupon. Same refund privilege. Offers applies to U. S. only.

ENGINEERING

Photo of Heald Electrical Laboratory

Enroll Now for New Term

Heald College Ranks FIRST West of the Mississippi in "Who's Who" in America

Send for FREE Information

Heald Engineering College

Van Ness at Post
San Francisco, California

Thousands of Engineers Needed for Hard Pressed Industry

BACHELOR OF SCIENCE DEGREE, 24 MONTHS

Degree Courses:
- ☐ Electronic Engineering
- ☐ Electrical Engineering
- ☐ Highway Engineering
- ☐ Mechanical Engineering
- ☐ Structural Engineering
- ☐ Civil Engineering
- ☐ Architecture

Diploma Courses:
- ☐ TELEVISION
- ☐ Tool & Die Design
- ☐ Architectural Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting
- ☐ Surveying
- ☐ Estimating
- ☐ Master Electrician

Approved for Veterans

NAME_____
STREET_____
CITY_____
STATE_____

Need an extra $1,000, $2,000, or more? Make it with an

IDEAL LAWNMOWER SHARPENER

There are thousands of lawnmowers in your locality; Average $1,000 profit per 250 mowers with customer satisfaction and repeat business assured. Provide this essential service with an Ideal® Lawnmower Sharpener, the only machine that grinds the reel to "fit" the bed knife. Compare by any standard. The Ideal, backed by 53 years of experience, costs no more. Write today for complete, free catalog.

The Fate-Root-Heath Company,
Dept. PS-12, Plymouth, Ohio

FULL SIZE MODEL KITS!

$5.95

THE ORIGINAL — Improved!

Complete, improved detail, easy to finish The original kit. Wood with process for gun metal finish. ORDER THESE MODELS DIRECT Ideal for den or game room.

NEW illustrated catalog of 9 models. For Catalog, Send 10¢ to:

O'BRIEN GUNCRAFT (C) P.O. BOX 657 MADISON, WIS.

Save on Gov't Real Estate

Buy Direct from Government, Surplus Homes, Islands, Farms, Land, etc. Listings $1.00. Send now & save $.

THE ABACUS PRESS
Dept. A, Box 169MMM E, Hartford 8, Conn.

...MAKE BIG MONEY WITH RAINBOW ROCK

. . . world's most beautiful slump brick. Cuts building costs by one-third. Sell all you make to contractors, supply houses, others. Needs no special skill. Operates indoors or out from common electric socket. Protected franchise. We help you start. Write for FREE facts.

Praised by architects, builders. Makes inside, outside walls, fences, porches, fireplaces.

GENERAL ENGINES CO., INC.
Dept. SR-125 Route 130, Thorofare, N. J.

Find URANIUM!!

GEIGER COUNTERS for uranium detection. All models and sizes — from low-cost, portable to super-sensitive airborne units. Prices start at $37.50. Also TREASURE DETECTORS and MINERALITES. • FREE INFORMATION •

Detectron CORP.
5528 Vineland, North Hollywood, Calif.

Personal RADIO

Amazing new midget radio. Slips into purse or coat pocket. Imagine...music, news, sports . . . right in the palm of your hand! Plays indoors or out. "Tunes in" local broadcasts. Gives clear reception. **Uses No Tubes, No Batteries or Electric "Plug-Ins".** Has new diode that eliminates them all FOREVER! A self-contained radio in attractive case with built-in speaker phone. Durably built to give long service. Not a toy, but a practical tiny radio for real fun and enjoyment. This COMPLETE READY-TO-LISTEN RADIO sent postpaid for only $4.95. Order yours today. No C.O.D.s. By mail only from:

NAFICO, Dept. R-12, Box 5, Sta. E, TOLEDO 9, OHIO

Copyrighted material

How I Found Relief For PILES

If you are among the thousands of men and women who suffer from Piles, Fistula or other rectal disorders, take the first step toward finding relief from these treacherous conditions. Send for our Free Book which describes symptoms, and the treatment that has proved so successful for so many years. Write McCleary Clinic and Hospital, 1271 Elms Blvd., Excelsior Springs 1, Missouri.

FREE BOOK GIVES YOU THE FACTS

RECTAL AND COLONIC DISORDERS and Associated Ailments

WRITE FOR YOUR COPY TODAY

WHOLESALE

ELECTRIC GUITARS PARTS—BUILD YOUR OWN

Solid-body Spanish, amplifiers, double-necks, single-necks, triple-necks, 4-necks, solid-body mandolin, electric violin, pick-up mikes, non-electric instruments, etc. 1956 Models wholesale. FREE CATALOG. Free home study course with instruments. Parts & plans available to build your own.

1956 MODELS WHOLESALE-FREE CATALOG

Fender and Martin available at list price

CARVIN CO., Box 287 Covina, Calif. PS-12

WHEELS WHEELS WHEELS

7" Disc Wheel	3/4" Tire	3/8" sleeve	45c ea.
8" Disc Wheel	1 1/8" Tire	1/2" sleeve	70c ea.
7" Disc Wheel	1" Tire	1/2" ball bearing	80c ea.
8" Disc Wheel	1 1/8" Tire	1/2" ball bearing	$1.00 ea.
6" Disc Wheel	1.50 semi-pneum. Tire	1/2" B.B.	$1.35 ea.
8" Disc Wheel	2" semi-pneum. T.	1/2" B.B.	$1.50 ea.
10" Disc Wheel	1.75 semi-pneum. T.	1/2" B.B.	$1.50 ea.
10" Disc Wheel	2.75 semi-pneum. Tire	5/8" B.B.	$3.50 ea.
12" Disc Wheel	1.75 semi-pneum. T.	1/2" B.B.	$1.85 ea.

Above wheel prices includes hub cap. Plus Postage. C.O.D.'s accepted.
AXLES—Sizes 5/16 in., 3/8 in., 1/2 in.—Cut to size—End holes drilled.

UNITED WHEEL STAMPING CO.
12131 S. PEORIA STREET PS-12 CHICAGO 43, ILLINOIS

---

25 Yulecards $1.00 plus 35¢ postage

Personal Photo Christmas Cards, including envelopes, from your own negative.

FREE SAMPLE ...send snapshot negative for free sample Deluxe Yulecard. Include 6¢ stamps for handling. Negative returned with sample. No obligation. Satisfaction guaranteed. Write today **YULECARDS,*** Dept. 35, Quincy 69, Mass. *Div. Mail-N-Save *T.M. Reg.

FREE! GIANT CATALOG

Benrus, Bissell, Detecto, Ekco, Gilbert, Gruen, Ideal Toy, Parker, Remington, Presto, Rival, Ronson, Sessions, Waring

MAKE BIG MONEY IN YOUR SPARE TIME...

Selling name brand merchandise. We give you everything you need to get started in your own business. FREE! Giant New 100 Page Color Catalog plus confidential dealers wholesale price list. You buy at lowest wholesale prices. All orders shipped immediately from our 3-giant warehouses. WRITE TODAY.

THE FRALEIB COMPANY
39 Union Square, Dept. P S New York 3, N. Y.

SAVE ON XMAS GIFTS — **BUY FROM IMPORTER**

A COMPLETE CAMP KIT!

Special 12 Pc. SPORTSMAN'S KNIFE

12.95 VALUE Only 4.95 WITH CASE

Eliminates 12 Items from Pack or Tool Kit

IDEAL GIFT FOR FATHER, SON OR FRIEND...

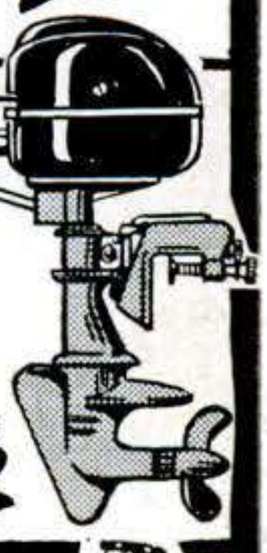
Here is the Perfect, Combination Knife-Tool for every Outdoor Sportsman, Hunter, Camper, Fisherman, Boy Scout, Ranger, Rancher, etc. Think of it! 11, Fine quality Steel Tools, precision made to fold easily into the heavy bone covered body. In one neat, compact unit you have (1) a regular knife, (2) a fork, (3) a spoon, (4) a draw-knife, (5) a bone-saw and fish-scaler, (6) scissors, (7) a can and bottle opener, (8) a cork-screw, (9) awl punch, (10) a screwdriver and (11) a metal file. All this PLUS a genuine leather, belt holster.

BUILD-IT YOURSELF BOAT KIT WITH INBOARD MOTOR 3.95

12 inch ELECTRIC BOAT KIT

with ELECTRIC MOTOR & SPOTLIGHT

Here is a genuine electric motor driven speedboat that will make many a young sailor happier this Xmas. The hardwood hull and deck are already completed (excepting paint) and is ready for final assembly. Included in this complete kit is an electric motor, flexible coupling, drive shaft with propeller, adjustable rudder, windshield, electric spotlight and other accessories and hardware. Can be finished and ready for launching in one hour. Motor and spotlight operate on 2 standard flashlight batteries.

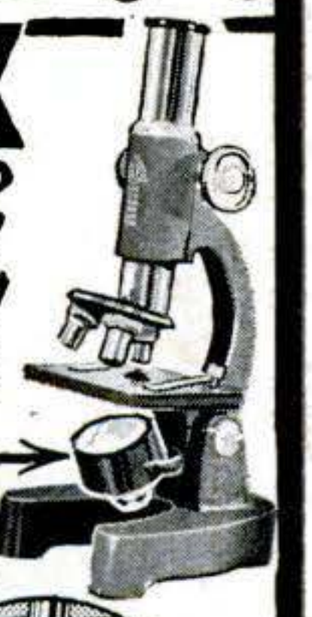


MINIATURE OUTBOARD MOTOR

Specially designed for use on model boats. Has swivel bracket with thumb screws for mounting. Runs forward or reverse. Operates on standard flashlight batteries. Overall lgth. 5". Weight 6 ozs.

6.00 VALUE 2.69

AMAZING-NEWLY DESIGNED 60 TO 450X MICROSCOPE



FEATURING 60, 120, 150, 180, 300 AND 450 POWER MAGNIFICATION

NEWLY DEVELOPED-Self-Contained SUB-STAGE LIGHT ELIMINATES NEED FOR EXTERNAL LIGHT SOURCE

Take advantage of our tremendous foreign purchase. Ideal for use by Amateur Scientist, Student, in Home Laboratory for study of insects, plant life, etc.

CHECK THESE FEATURES

1. Triple, revolving turret with 10X, 20X, 30X precision ground & polished lenses.
2. Two interchangeable eyepieces, 6X and 15X with precision ground and polished lenses.
3. SIX MAGNIFICATIONS for all purposes — 60X, 120X, 150X, 180X, 300X and 450X.
4. NEW! Sub-stage with SELF-CONTAINED LIGHT. No external light source needed.
5. Large sub-stage mirror for use with external light sources.
6. All Metal Body — inclines through 90 degrees.
7. Special Hardwood Case and 3 glass slides.

FREE with MICROSCOPE— 8 Pc. DISSECTING SET with hardwood case. Has Scalpel, Scissors, Tweezers, etc.

Only 12.95 INCLUDING DISSECT SET

SATISFACTION GUARANTEED OR MONEY BACK

ORDER TODAY for Xmas Delivery—Pay by Money Order or Check. ½ deposit with C.O.D.'s. All prices F.O.B. Los Angeles.

Palley SUPPLY CO. 2263 E. VERNON AVE., DEPT. PS-12 LOS ANGELES 58, CALIF.

Copyrighted material

If it weren't for brand names you'd have to be an engineer to know which TV set to buy

The most complicated piece of equipment in the American home is a television set.

Yet you're not afraid to go out and buy one without even "looking under the hood."

What makes you so sure of yourself? In fact—how can you buy so *many* things you know so little about, without worrying?

Isn't it because you've learned the secret of safe and sound buying?

A good brand is your best guarantee. No matter what kind of a product you're buying, you know you're right when you buy a good brand. You know the manufacturer will stand behind it because his reputation is at stake. You can depend on a good brand.

The more good brands you know, the fewer buying mistakes you'll make. Get acquainted with the good brands in these pages and get more value for your shopping money.

BRAND NAMES FOUNDATION
Incorporated

A Non-Profit Educational Foundation

37 West 57th Street, New York 19, New York

A GOOD BRAND IS YOUR BEST GUARANTEE

Copyrighted material

WORLD'S GREATEST

CLASSIFIED OPPORTUNITIES

Here are hundreds of opportunities offered especially to the readers of Popular Science Monthly. Read them. Answer them! You can make and save money.

POPULAR SCIENCE MONTHLY — 353 FOURTH AVE. — NEW YORK CITY 10

Classified Ads only 90c per word insertion, payable in advance. Minimum ad 10 words. To be included in February issue, copy should be in our office by December 21. No cancellations accepted after December 15th. Address orders to O. K. Kelly, Classified Adv. Mgr.

1 AUTOMOBILES & MIDGET CARS

CLYMER'S Catalog All 1955 Automobiles. $1.50. 1955 Mobilgas AAA Economy Run Book gives every detail, 150 photos, $1.50. How to build a Fiberglass Body Car $2.00. World's Famous Aircraft Book $1.50. 1955 Indianapolis Race Yearbook $1.50. All postpaid. Catalog Free. Floyd Clymer, Dept. 12-PS, 1268 S. Alvarado, Los Angeles, Calif.

HENRY'S Wonderful Model T. Floyd Clymer's latest, largest, finest book published by McGraw-Hill. Large 220 page, beautifully bound gift book, 500 illustrations, all models shown, unusual Model T Data never published before, including experimental models, jokes, songs, poems, parts, accessories and listing all model numbers. Every T enthusiast, past or present owner, historian and collector will treasure this new book just off the press. $5.95 postpaid. Floyd Clymer, Dept. 12-PS, 1268 S. Alvarado, Los Angeles, Calif.

HUNDREDS of automobile catalogs—American, antique, Foreign; Dealer Books, glossy photographs, shop manuals; Free motor Magazines—offered by non-profit club. Write immediately; Get on free mailing list. Auto Maniacs, Inc., Stockbridge, Michigan.

CHEVROLET Owner's Complete Handbook. Newly revised, just published. Full information all Chevrolet Six models, 1929 to date, including latest 1955 V-8s. Also includes powerglide. Finest book for Chevrolet mechanics and owners ever published. Written for average owner, nontechnical language. 224 pages, 325 illustrations. $2.00 postpaid. Floyd Clymer, Dept. 12-PS, 1268 S. Alvarado, Los Angeles, Calif.

FOREIGN Car Scrapbook. 224 pages, 400 illustrations, early British, German, French, Italian cars. Historical, educational, humorous. Enthusiasts', Collectors' delight. $2.00 postpaid. Catalog free. Floyd Clymer, Dept. 12-PS, 1268 S. Alvarado, Los Angeles, Calif.

BRIT Rest-A-Leg. 100% guaranteed from driving strain, no drilling, faster, service remit by postal $4.95 P.P. T.G. Haines, 2509 Circle Drive, St. Louis 17, Missouri.

CLYMER'S latest antique car catalog. Just published. All 1912 U.S. automobiles illustrated with specifications. $2.50.—Catalog all 1927 automobiles, specifications. $2.50 postpaid. Book catalog free. Floyd Clymer, Dept. 12-PS, 1268 S. Alvarado, Los Angeles, Calif.

ANTIQUE Automobile Handbook. 224 pages, 400 illustrations. Complete information repairing all automobiles of 1920s and earlier. $2.50 postpaid. Floyd Clymer, Dept. 12-PS, 1268 S. Alvarado, Los Angeles, Calif.

ANTIQUE Automobile color slides, 2x2. Illustrated catalog Free. Universal, Box 779P, Beverly Hills, Calif.

FORD Owner's complete handbook. Newly revised, just published. Covers all Ford V-8s, 1932 to latest 1955 Six and V-8 models, also Fordomatic. Finest book for Ford owners or mechanics ever published. Written for average owner in non-technical language. 224 pages, 350 illustrations. $2.00 postpaid. Floyd Clymer, Dept. 12-PS, 1268 S. Alvarado, Los Angeles, Calif.

USE THIS HANDY INDEX TO FIND WHAT YOU WANT

Advertising, Agencies for Advertisers . . . 53
Agents Wanted . . . 43
Antiques, Relics & Indian Goods . . . 29
Authors Service . . . 52
Auto Supplies & Equipment . . . 2
Auto Trailers . . . 3
Automobiles & Midget Cars . . . 1
Aviation . . . 5

Batteries, Generators, Etc. . . . 6
Boats, Outboard Motors . . . 11
Body-Building Courses, Jiu Jitsu, Etc. . . 12
Books & Magazines . . . 23
Build It Yourself . . . 66
Business Opportunities . . . 37
Business Service, Information, Name Lists . . . 50

Cameras, Photo Supplies . . . 34
Camping Equipment & Tents . . . 16
Cartooning, Sign Painting, Chalk Talks . . 54
Chemistry & Physics . . . 41
Claim Investigators . . . 37A
Coins & Currency . . . 26
Contests . . . 46

Detectives . . . 47
Dogs, Birds, Hamsters & Pets . . . 17
Drawing Supplies & Equipment . . . 76

Educational & Instruction . . . 45
Electrical Supplies & Equipment . . . 7
Engines, Motors, Etc. . . . 10

Farms, Other Real Estate . . . 19
Field Glasses, Telescopes . . . 14
For Inventors . . . 60
For Sale Miscellaneous . . . 71
For the Home . . . 69
Formulas, Plans, Etc. . . . 39
Frog Raising . . . 18

Games & Entertainment . . . 24A
Geiger Counters, Treasure Finders . . . 77

Help Wanted . . . 42
High-grade Salesmen . . . 44
Hobbies, Collections . . . 31
Home Craftsman . . . 65
Hypnotism . . . 24

Inventions Wanted . . . 61

Language Outfits . . . 48

Machinery, Tool Supplies, Etc. . . . 9
Magic Tricks, Puzzles, Etc. . . . 25
Manufacturing . . . 63
Minerals & Precious Stones . . . 30
Miscellaneous . . . 79
Models, Model Supplies . . . 64
Moneymaking Opportunities . . . 38
Motion Pictures, Slides, Sound Equip. . . 33
Motorcycles, Bicycles & Supplies . . . 4
Music, Song Writers & Records . . . 35

Of Interest To Women . . . 70
Old Gold, Jewelry, Watches . . . 67
Old Stamps Wanted . . . 27

Patent Attorneys . . . 59
Patents For Sale . . . 62
Personal . . . 80
Photo Finishing, Photocopies, Etc. . . . 32
Plastics . . . 40
Plays, Stories, Etc. . . . 49
Poultry & Supplies . . . 21
Printing, Multigraphing, Etc. . . . 57
Printing Outfits, Supplies . . . 58
Profitable Occupations . . . 22

Radio, TV, Supplies & Equipment . . . 36
Razor Blades, Shavers . . . 74
Rubber Stamps & Office Supplies . . . 56

Special Services . . . 51
Sporting Goods, Guns, Fishing Tackle, Etc. . . . 15
Stamp Collecting . . . 28

Tattooing Supplies . . . 75
Taxidermy . . . 13
Tobacco & Pipes . . . 68
Trees, Shrubs, Roots & Herbs . . . 20
Typewriters & Office Machines . . . 55

Wanted to Buy . . . 72
Watch Repairing . . . 78
Wearing Apparel . . . 73
Welding, Soldering . . . 8

FIBERGLASS Car Book. How to build one, by expert author. $2.00 postpaid. Floyd Clymer, Dept. 12-PS, 1268 S. Alvarado, Los Angeles, Calif.

CLYMER'S Scrapbook of early advertising. 1880 to 1920. Famous products of yesteryear, illustrated in text, pictures, early "corny" advertisements. Educational, historical, comical. 224 pages. Real collectors' item. Just published. $2.00 postpaid. Floyd Clymer, Dept. 12-PS, 1268 S. Alvarado, Los Angeles, Calif.

2 AUTO SUPPLIES & EQUIPMENT

AUTO Accessory & Parts Catalog. 1956 edition—All New! 164 pages. Save up to 50%—over 50,000 items, including Hollywood Accessories, Hi-Speed Equipment, Rebuilt Engines, all parts and accessories for all cars and trucks! Hard-To-Get parts! Send 25c (refundable). J. C. Whitney, 1919-PS Archer, Chicago 16, Illinois.

FREE Discount catalog—Speed, power, custom equipment. Almquist Engineering, Milford 3, Pennsylvania.

BUY Wholesale nationally advertised auto supplies, thousands other products at big discount. Free "Wholesale Plan," American Buyers', Hertel Station, Buffalo 16-S 1, N. Y.

LATEST Custom accessories . . . Items not in stores. New low prices. Continental tire kits, push-button doors, trunks, etc. New illustrated catalog . . . biggest ever, 25c. Eastern Auto, 3319-D South Grand, Los Angeles 7, California.

FORD T Parts?—Try best source Old Car parts anywhere. Wisniewski, Milwaukee 7, Wisconsin.

HYDRA-Matics and Fordomatic transmission parts, new and rebuilt. 75% off on most parts. Fully guaranteed. Send for quotations. Transco, Box PS-1892, 221 West 41st Street, New York City 36.

FREE illustrated, descriptive information "The Truth About Water Injection." Injector, Box 526, Burbank, California.

FORD genuine New Engine Parts V8—60, Cadmium rod bearings $4.00 set. Send for free price list. California Auto Parts Co., 3320-P So. SanPedro St., Los Angeles 11, California.

LACHAPELLE'S patented treatment. Will make your motor better. Ferns, Box 71827-D, Los Angeles 1, California.

ELECTROPLATE autoparts, novelties, mirrors. Easy, inexpensive home processes. Free booklet. Tyco Metals. Box 13231-FC, Houston 19, Texas.

SENSATIONAL GE-Subzero Auto Engine Heater starts coldest cars, trucks, tractors immediately. Special $3.95 (regularly $8.95). Order for yourself, sell others locally and mailorder. Huge profits. Terrific quantity discounts. Act Now! Wisniewski Inc., PS, Milwaukee 7, Wisconsin.

CAR Burning oil? Losing compression? Try Clifford's Compression Seal, Tube $2 postpaid. Clifford's Engineering, 452 Claim, Aurora, Illinois.

JEEP Owners—V8 Power. Read Jeep Owners ad. Page 270.

Copyrighted material

"ATTENDANT! Please Clean My Windshield." Copyrighted Gas cap and vent window decals remind station attendants who often neglect. 50c each. Order—today. Jac-D-Cal, 682 Cecil, Louisville 11, Ky.

CUSTOMIZE your car—Complete step by step instruction booklet, $1.00. Alanne, Box 135, Watertown 4, Conn.

RADIOS' Custom for 1952-3-4-5-6 Fords $38.90. Free literature. Nordic Radio, Box 582, Evanston, Illinois.

AMAZING Safety Belts. Easy to open. $8.95 each. Free gift with each belt. Value $4.95. Free brochure. Home Supply Service, 704-PS First Street, Kiel, Wisc.

DISCARDED GM71-110 Injector Parts Wanted. Bonus on HV. Mayer, 7120 Carnegie, Cleveland 3, Ohio.

BUY Wholesale 550,000 Products. Literature Free. Carter, Box 6011-FE, Chicago 80.

BALANCE two front wheels yourself. Weights and copyrighted instructions $3.50 postpaid. Hiddenglen Company, French Gulch, California.

IT'S New Coiltenna. For car radios. Brings twice as many stations, twice as strong with less static. Installs on your present antenna in minutes. No special tools needed. Send $3.95 and Diameter of your present antenna to Ekmar Products, 1211 Mohawk Lane, St. Joseph, Michigan. Sorry no C.O.D.'s. Dealer inquiries invited.

WINDOWS ice up? Prevent fogging. Sleet and ice from sticking. Get Anti-fog Cloth 50c. Box 23, Auburn, N.H.

START your car in any weather with Sure-Start $10.00. P. Natale, 1015 Home Street, Bronx 59, New York.

TAPPET noises in Fords, Chevrolets and Mercurys stopped with our silencers. Literature. Kaye Products, 2067C S. Layton Blvd., Milwaukee 15, Wisconsin.

AUTOMOBILE compasses: Postcard brings literature on all major makes. Paul L. Howland, Wichita 4, Kansas.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The February issue closes on December 21. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 1255, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

3 AUTO TRAILERS

BUILD your own trailer! Plans for all kinds. Illustrated catalog 10c. Jim Dandy, 125-S. Wausau, Wisconsin.

EXCEPTIONAL Expanding eight foot trailer. Accommodates family of five. Build Yourself—literature, 10c. Framar Company, Wilmington, Mass.

4 MOTORCYCLES, BICYCLES AND SUPPLIES

MOTORBIKE engine $7.50, Cushman motorscooter $30. Midget car, less engine $16. Engines $5 up. (Mailorder only). Send 25c (35c for first class mail) for new Directory-catalogue Number 68 listing the above and hundreds of other bargains in new and used midget cars, motorscooters, homebuilders parts, plans, etc. Midget Motors Directory, Athens, Ohio.

VINCENT Motorcycle Owner's Handbook. Just published. 224 pages, excellent illustrations. Full non-technical details servicing all model Vincent Motorcycles. $2.00 postpaid. Triumph or Ariel Owner's Handbook, excellent owner service information $1.50 each. Modern Motorcycle Mechanics, largest best book covers all makes motorcycles $5.00. Clymer's Cycle Magazine, all about motorcycles, new models, racing technical information, road tests. Every motorcyclist needs this informative, interesting, educational monthly magazine. Only $3.50 per year. Sample copy 35c. Floyd Clymer, Dept. 12-PS. 1268 S. Alvarado, Los Angeles, Calif.

PARTS—accessories. Motorcycles, Bicycle. Catalog 50c. Bunico, 146, Covington, Virginia.

RECONDITIONED Motorcycles and motors. Chromium accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales, Kansas City 27, Missouri.

BICYCLE Owner's Complete Handbook. Full information repairing all bicycles. Written for the average owner. Well illustrated. $1.00 postpaid. Floyd Clymer, Dept. 12-PS, 1268 S. Alvarado, Los Angeles, California.

MIDGET Motors $8.00 up. Wheels 90c up. Clutches, Chains, Sprockets. List 25c. Donz, Mount Ephraim, New Jersey.

5 AVIATION

AVIATION surplus bargain catalog. One dime. Box 22F2, Thomasville, Penna.

HELICOPTERS. 1 and 3 man aviation marvels. Construct own. Instructions $3.50, $6.00, Respectively. Mayberry Aircraft, Box 343, St. Clair Shores, Michigan.

LIGHTPLANE plans, information, $4.75 postpaid. Brochure, dime. W. Fike, Box 683-Q, Anchorage, Alaska.

BUILD a fast, safe airboat or snow sleigh from your 65-200 H.P. aircraft engine. Propellers, Plans, Supplies. Satisfaction guaranteed. 48 page catalog 25c. Banks-Maxwell Co., Box 3301G, Ft. Worth 5, Texas.

BUILD A man carrying Helicopter Jet Engine Yourself! "Practical Ram Jet Design" $1.00, "Practical Pulse Jet Design" $1.00. Also Centrifugal Propulsion Details $1.00, Money Back Guarantee, Decker Engine Works, Plasterco, Virginia.

FLIGHT Engineering career. Guaranteed results. Must have commercial license or multiengine A & E experience civilian or military. Write for complete details. Flight Engineering, Box 195, Bradley Field, Windsor Locks, Connecticut.

6 BATTERIES, GENERATORS, ETC.

EDISON Nickel Storage Batteries. Any voltage, any amperage. Unconditionally guaranteed. Power Plants, Generators, Motors. Literature. Hawley Smith Co., Croton Falls 2, New York.

7 ELECTRICAL SUPPLIES & EQUIPMENT

ELECTRIC Pencil: Engraves all Metals. $1.50. Beyer Mfg., 10511-C Springfield, Chicago 43.

ELECTROPLATING equipment, anodes and solutions for all types of plating. Instructions. Assemble your own plater and save. Free Catalog. Ramyr, Dept. E-2, 1624 East First Street, Los Angeles 33, California.

LAMPS—25c brings bargain catalog showing all parts for repairing, building. Contains instructions for electrifying vases, oil lamps, etc. Gyro Lamps, 5402B Clark, Chicago 40.

8 WELDING, SOLDERING

"BUILD-Ur-Own" a.c. welder and a.c. power plant with a good used engine and low cost Hobart generator. Welds anywhere and supplies 5KW stand-by power for any emergency. Write Hobartweld, Box P-1253, Troy, Ohio.

NEW, Portable oxy-acetylene outfit welds sheet, light plate; cuts heavy steel; heats, brazes. Just change tips. Complete, with instructions, only $76.50. Special moneysaving plan for oxygen and acetylene supply. Write today for free literature: Dept. S, Linde Air Products Company, 30 East 42nd Street, New York 17, N.Y.

ACETYLENE Welding outfits new $49.00; used $29.00; Arcwelders $56.50. Eagle Welding, Dept. 42, 5085 Broadway, Chicago 40, Ill.

WELDERS, 110/220, Welds ½". $39.50. Morris, 1070 Inner Drive, Schenectady, New York.

A. C. Welders, four sizes, lowest prices. Free Literature. Holgerson Co., Canton, Kansas.

9 MACHINERY, TOOL SUPPLIES, ETC.

AIR Compressor. Build yourself. Circular 10c. Little Machines, Hamilton, Mich.

ALLEN Two Ton Power Bench Type Punch Press. $97.50. Circular. Allen, Dept. PSB, Clinton, Missouri.

MILLING Machine: New, Accurate $149.50. Southern Machine Tool Company, Conyers 4, Georgia.

JEEP Owners—V8 Power. Read Jeep Owners ad. Page 270.

RADIUS: And Ball Turning Tool Post—Turns Thousands of Different Size Concave, Convex Radii 0" To 4"—No Special Tools To Grind. Radius Tool, Box 476, St. Louis 12, Missouri.

MILLING Attachment, South Bend, Atlas 9", 10" lathes. Castings, stock, instructions $7.50 postpaid. Literature: Floyd McGuckin, 314 Monroe, Ridgewood, N. J.

BIG Factory Catalog! Buy direct—Save Middleman's profits; hundreds of labor saving tools and equipment—tremendous savings. Send 10c. Master Mechanic Mfg. Dept. CL-100, Burlington, Wisconsin.

CONVERT your ¼" drill or drill-press to ½" capacity. Indispensable to mechanics and home craftsmen. Guaranteed. Send $3.00. Jewel Mfg., 727 Franklin Avenue, Franklin Square, New York.

LAWNMOWER grinder, New fast, different. Write: Turner-Cline, 430 Yellowstone, Pocatello, Idaho.

10 ENGINES, MOTORS, ETC.

WINDING Data, listing 225 motors, single and three phase. $1.00. Motor Data, Box 7631, Kansas City 28, Mo.

BRIGGS and Stratton Clinton Lauson Power products. Wisconsin Reo engine parts. Weeden Company, Wakefield, R.I.

REWIND Motors yourself. Complete instructions $1.00. Lewis Mfg., Howell 11, Michigan.

MOTOR rewinders instruction manual $1.00. Modern, Box 8715, Kansas City 14, Missouri.

11 BOATS, OUTBOARD MOTORS

NEW, used rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

OUTBOARD Motor Parts—New—Used for all makes. Send stamp for price quotation, listing parts needed. Outboard Motor Mart, Inc., 229D State Street, Boston, Massachusetts.

FREE Catalog! Boat Kits, Trailers, Fiberglas, Marine Hardware. Luger Industries, Dept. K, 4452 Nicollet, Minneapolis, Minnesota.

FULL size, cut-to-shape Boat Patterns, Blueprints. 7½-38 feet. New 1955 illustrated "Build A Boat" catalog of 50 naval architect-designed Cruisers, Runabouts, Sloops, Skiffs, Outboard Boats, Sailing, Racing, Houseboats, 50c. Small Boat Hardware Catalog, $1.50. Bigger, better 1955 "How to Build Boats" book, $2.50. Cleveland Boat Blueprint Co., Dept. A-77, Box 1651, Cleveland 4, Ohio.

BUY Wholesale nationally advertised outboards; thousands other products at big discount. Free "Wholesale Plan." American Buyers', Hertel Station, Buffalo 16-T1, N. Y.

MARINE hardware, used and new engines. Write your requirements for packaged deal price. Lamberts', 4727 Burnet Road, Austin, Texas.

FIBERGLASS cloth, Government surplus, 72" wide O.D. coated, lowest price in the world, 48c yard in full rolls, or 60c yard, any quantity. F.O.B. Miami, Florida. Textile Products, Inc., P.O. Box 226, Allapattah Station, Miami, Florida.

BOAT Plans, Patterns, Frame Kits, Modern inboards and outboards 11'—22' for amateur builders. State requirements or send 40c for complete Catalog. Glen Marine, Box 568, Compton, California.

MARINE conversions for Ford and Jeep engines. Catalog 25c. Lehman Manufacturing Co., 972A Broad St., Newark 2, N.J.

GLASTICOTE, paint, boat hardware and accessories. Complete catalog $1.00. Marine Associates, Box 6188-SD, Long Beach 11, California.

Copyrighted material

BOAT plans: Welded steel, wood, plywood. Inboards, cruisers, sail. Free Literature. Please specify size, type. John B. Clark, N.A., Box 51, Bay Village, Ohio.

WHOLESALE! Sea Legs Boat Kits, factory prices from $31.98. Savings to 25%. Pre-assembled frames, pre-cut parts, illustrated instructions. Penney Woodcraft Industries, Dept. C-46, Defiance, Ohio.

12 BODY-BUILDING COURSES, JIU JITSU & ATHLETIC EQUIPMENT

BUILD powerful arms, chest, shoulders! 22 exercises, $1. Fonsad, Box 601-C, 1100 Market, Wilmington 99, Delaware.

100 TRICK Knockouts for self-defense. $1.—1c each. Priest, Box 251, Evanston, Illinois.

PUSHED around? Why take nonsense from Bullies. Give them the surprise of their lives. Easy when you know Police Jiu Jitsu. Complete fully illustrated course in one volume same as taught police and armed forces. Send $1 now for Police Jiu Jitsu postpaid. Satisfaction guaranteed. Books Publishing Company, Amityville 2, New York.

MEN'S Athletic Supporters. Comfortable Form-Fitting Pouch. S-M-L $1.00. Poly Shop, Box 3203, Ft. Worth 5, Texas.

BARBELLS, Dumbbells, Exercise equipment Courses. Free booklet. Good Barbell Co., Reading, Penna.

14 FIELD GLASSES, TELESCOPES

FREE Catalogue! Thousands war surplus optical bargains, Lenses, Prisms, Telescopes, Binoculars, etc. Send $1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 691 West Merrick Road, Lynbrook, New York.

IMPORTERS' amazing prices Precision Binoculars, 22 models. Free trial. Folder, "Binocular Selecting," catalog free. Prentiss Importers, Mercury Bldg., West Los Angeles 25, Calif.

REFLECTOR Telescope Kits $6.25 (3") to $175. (12"). Mirrors, Cells, Focusing Mounts, Tripods, Eye-Systems. Anything, everything in telescopes. Free Illustrated Catalog. Also ready to use telescopes from $25. to $176. Inquiries to Esco Products, 1428 Willow Ave., Dept. PSM-12, Hoboken, N. J. Sales Showroom, 166 Church St., N.Y.C.

WAR Surplus bargains! Millions of lenses, instruments, telescopes, binoculars, components and complete line of astronomical telescope items. World's greatest optical market place! Send only $1.00 for beginner's 10-lens kit and big instruction booklet Stock 2-CN. Write for catalog-CN Free! Edmund Scientific Corp., Barrington, New Jersey.

REFLECTING Telescopes, completely assembled. 60X. $29.75. Guaranteed Observatory clearness. Free information. Skyscope, 475 Fifth Avenue, New York 17.

6 THUMBS on each hand? Even you can assemble our Telescope Kits from our easy instructions. Enjoy the heavens with a high precision telescope assembled in less than an hour. You'll like our complete line of telescopes, microscopes and accessories, biological stains, etc. Send for free catalog T of finest quality and newest design astronomical kits or free Catalog M of microscopes. Optical Engineering Co., 164-19 Northern Boulevard, Dept. PS, Flushing, New York.

UNITED Binoculars. Ideal Christmas Gifts. $3.95 to $250.00. Free 56 page Binocular-Telescope Catalog. United, 9043 S. Western, A-1116, Chicago 20. Dealers Wanted.

MAKE 6" Telescope reflector. Glass, abrasives, instructions—$10.50. F. Cameron, Box 65, Inwood 96, New York.

LOWEST Prices, All Sizes, Binoculars, Telescopes, Microscopes, Also Repaired. Free Catalog. Joe's Binocular Sales, 4827 Second Street, Detroit 1, Mich.

BUILD your own Reflector Telescope. Complete kit: Mirrors, Eyepieces, Tripod, all other accessories. Request free illustrated literature. Criterion Manufacturing, Dept. KP-14, Hartford, Connecticut.

PRECISION lens list and microscope circular. General Science, Box 8423, Minneapolis 16, Minn.

DYNASCOPE—Sensational New Reflector Telescope. Send for details. Criterion Company, Dept. DS-20, Hartford, Connecticut.

SPECIALISTS! Used microscopes & accessories. Unusual slides. Supplies. Catalog Free. Research Scientific Supplies, 60 Wall St., New York 5.

BINOCULARS, telescopes, microscopes. Terrific values $3.98 up. Request free money-saving catalog. Criterion, Dept. S37, Hartford, Connecticut.

TELESCOPES, Microscopes, binoculars, past quarter century. Comprehensive scientific instrument catalog $1.00. None free. Dollar deductible from orders. Harry Ross, 70 West Broadway, New York, N. Y.

400X TELESCOPE easily made. Kit includes focusing tube, erector, five finished lenses and building instructions—$3.75. Giant astronomical telescope completely assembled with tripod—$15.00. Free information. Suffolk Science, Mattituck 4, New York.

ASTRONOMICAL Telescopes. Unitron, Astrola. Astronomical Books. Rasmussen—Reece, Amsterdam, New York.

ASTRONOMICAL Books, Star-Atlases, free list. Herbert Luft, 42-10 82nd Street, Elmhurst 73, New York.

MICROSCOPES, binoculars, everything optical and photographic direct from importer. Lowest prices. 25c catalog. Magnification Instrument Co., 2 E. 45th Street, New York City.

15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

180 PROFUSELY illustrated pages, antique pistols, swords, daggers, armors, etc. 50c. Robert Abels, PS860 Lexington Ave., New York 21.

SWIMMERS! Send $3.95 for Imported French Mask. Catalog of Skin Divers' Equipment and Books 25c. Aquafun P-S, Davenport, Iowa.

FREE Fishing Catalog—148 Pages, Over 3,500 Hard To Find Fishing Specialties. Netcraft Company, Dept. PS1, Toledo 13, Ohio.

BUY Wholesale nationally advertised sporting goods, thousands other products at big discount. Free "Wholesale Plan." American Buyers', Hertel Station, Buffalo 16-U1, N. Y.

SEND for free ammunition list from America's foremost ammunition house. All types including Jap, German, Italian, etc. Philip Jay Medicus, 18 Fletcher St., New York 38, New York.

MAKE 500 lifelike flies fur materials $1.00. Francis Crane, Schenectady, N. Y.

GOLFERS send $4.00 ball retriever from water, compact fits bag. Guaranteed. Stebco, 2548 No. Main, Fall River, Mass.

100,000 GUNS—Accessories!!!—Winchesters, Colt's, Kentuckies—Antique—Modern Gun Bargains—Time Payments. Super catalog 50c. Agramonte's, Yonkers 2A, New York.

5,000 BARGAINS, firearms, binoculars, war relics, catalog 50c. Smith Museum, Runnemede, N. J.

FLY-Makers! 1955 free catalog. D. H. Thompson, 335 Walnut Avenue, Elgin, Ill.

MOLDS for Fisherman's Sinkers. Jigs, Squids, Casting and Spinning Lures. Free Catalogue. Sweet's Molds, Tonawanda 3, New York.

SAMPLE: 25c copy of "The Archers' Magazine." Send 10c: 1200 Walnut Street, Philadelphia 7, Pennsylvania.

BUY Wholesale! Guns, Fishing, Sporting Goods. Save 66-2/3%! Free Catalogs. National Buyers Service, Box 426FC, Oakland, California.

SENSATIONAL 8-Blade pocket knife 2-inches long stainless steel bone handle $2 95. Money-back guarantee. Dealers wanted. Vaughn-Importers, 5454 Aura, Tarzana, California.

MANY Modern, Antique guns. List 10c coin. Ed Howe, 26 Main, Coopers Mills, Maine.

JEEP Owners—V8 Power. Read Jeep Owners ad. Page 270.

SPORTSMEN, Free Bargain Circular, Gov't. Surplus, Premiums. General Mdse. Co., Box 144, Rahway, New Jersey.

JAP rifles altering American shells $6.00, Jap shells $3.65, catalog 5c. TP Shop, West Branch 10, Michigan.

SEMI-finished bows and arrows. Catalog. Jim Deeds Archery, 5151B Branciforte Drive, Santa Cruz, California.

MOVING Target—Battery operated. Varied speeds. Motor, Steel deflector, targets. $3.50. Michetti, 1192 Janice Drive, Santa Clara, California.

ARCHER'S Free New Illustrated Catalog—Pride Archery Company, RFD#1, Danbury, Connecticut.

16 CAMPING EQUIPMENT & TENTS

TENTS, camping equipment. Send 10c for 100 page tent, camping equipment 1955 catalogue-handbook. Morsan, 10-21G 50th Avenue, Long Island City 1, New York.

17 DOGS, BIRDS, HAMSTERS, RABBITS & PETS

MAKE Big Money! Raise Chinchilla Rabbits. Cash Markets Supplied. Write Today! Rockhill Ranch, Sellersville 16, Pa.

RAISE moneymaking Angora, New Zealand Rabbits. Particulars free. White's Rabbitry, Jackson, Michigan.

HAMSTERS—golden; young, $3.00 pair: fully developed, $4.00 pair. Adirondack Hamstery, Prospect 129, New York.

RAISE Mink: Free booklet, pen plans, inside "secrets," feed, care. Mink are money makers. Investigate today. Lawrence Molgard, Brigham City 13, Utah.

CHINCHILLAS Closing out $100 to $200 Pair. Bright's Chinchillas, 2312 N. 38 Street, Kansas City, Kansas.

NATURALISTS Catalog 15c. Hamsters $4.75 trio. Quivira Specialties, Topeka 10, Kansas.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 177, 2954 Admiral Way, Seattle, Washington.

MAKE Big Money Raising Chinchillas, Cavies, Mink, Rabbits, or Pigeons for us. Free information. Keeney Brothers, New Freedom, Pennsylvania.

PUREBRED Chinchilla and New Zealand Rabbits. Write—Wilson's Rabbitry, Greer, South Carolina.

18 FROG RAISING

"FROG Raising!" Get ready now for next spawn. New book tells how. Folder 10c. Broel- B, Box 506, New Orleans 1, Louisiana.

19 FARMS, OTHER REAL ESTATE

SEE our ad on page 54. The Abacus Press.

STROUT Catalog—Mailed Free! Farms, Homes, Businesses, 36 States, Coast-to-Coast, 2,914 Bargains described. World's Largest; 55 Years Service. Strout Realty, 255-ZB 4th Avenue, New York 10, N. Y.

FLORIDA Waterfront homesites on famous Saint John's River $50.00 front foot. Also inland lakefront five miles from River, $195.00—$995.00. Specify which literature. Easy monthly payments. Pine Lakes, Eustis, Florida.

CALIFORNIA farm and ranch lands. $15 to $35 per acre. 10 to 640 acre parcels. Easy terms. Free catalog. Pacific Tax Sales, 1621-B Cahuenga, Hollywood 28, California.

Copyrighted material

FLORIDA—Nice homesites, $245 at $10 monthly. Folder Free. Winfree Vernor, DeLand, Florida.

FLORIDA—Beautiful Retirement Homesites near Gulf Coast. Finest Fishing, Hunting. $250 and up at $10 Monthly. Write William Mathews, P. O. Box 1406, Asheville, N. C.

FLORIDA—Several five acre tracts. Grand climate and location. Near Gulf of Mexico for Fishing, Boating, Bathing. Priced at $985.00, $20.00 down, $20.00 month. Information write G. B. Potterfield, Owner, Union Bldg., Dept. X, Charleston, West Virginia.

HOMESITES $15 Monthly—California's finest garden section—Morro Bay's scenic shores. Wonderful fishing, boating. Fertile soil, softest water, temperate climate, congenial community. Free literature. Richard Otto, Department P, San Luis Obispo, California.

FLORIDA Lakefront homesites near Ocala Forest. Excellent fishing-hunting. $10.00 monthly without interest. Complete price $195.00-$995.00. Literature. Grace Parker, Paisley, Florida.

21 POULTRY & SUPPLIES

POULTRY Farmers—Broiler Growers—Turkey Raisers read the new American Poultry Journal for latest ideas and greater profits. 12 months, 50c. Special offer, 4 years, $1.00. American Poultry Journal, 182 North Wabash, Chicago.

RAISE pheasants on $100 week plan. Little capital and space can make you independent. Free details. Great Central System, Columbus 6, Kansas.

22 PROFITABLE OCCUPATIONS

"HOW to Make Money With Home Workshop" describes amazing methods used by hundreds of successful craftsmen. Tells what to make. How to sell workshop output spare time. Write at once for details. Craftsman, 115B12 Worth St., NYC.

$5000 FROM Half Acre growing Ginseng, crop bought. Particulars 10c. Associated Growers, Sperling, Manitoba.

BUY Wholesale thousands nationally advertised products at big discount. Free "Wholesale Plan." American Buyers, Hertel Station, Buffalo 16-M1, New York.

WELDING Pays $$$. Learn easily at best equipped school in country. Nonprofit school with low cost training. G.I. approved. Write Hobart Trade School, Box P-1252, Troy, Onio.

DETECTIVES Earn Big Money. Excellent opportunity. Detective Particulars free. Write, Wagoner, P-125 West 86th, New York 24.

$200 WEEKLY Cleaning Venetian Blinds. Free book. Burtt, 2434B, Wichita 13, Kansas.

FREE illustrated instructions. Raising, selling earthworms. Johnny K's Hatcheries, 965 Selby, St. Paul 4E, Minn.

FREE Folio "Up to $45,000; Unlimited Vacations." No merchandise, equipment. Unknown! Work home—sparetime! Haylings—S14, Carlsbad, Calif.

MEN Wanted—Build luggage and Cases at home. We sell your products—supply complete instructions, materials, everything. No special equipment needed. Free details. Casecraft, 805-H Sunset, Los Angeles 12, California.

WHOLESALE Catalog! 30-80% Discounts! Appliances, Musical Instruments, Typewriters, Phonographs, Watches, Jewelry, Recorders, Housewares, etc. Consolidated Distributors, 21-19 Lafayette, Paterson 15, New Jersey.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165 in few weeks. Free Book. Washington Mushroom Ind., Dept. 101, 2954 Admiral Way, Seattle, Washington.

MUSHROOM Spawn plus complete instructions various processes. $1.00. Chrisenross, 641 S. 19th, Newark 3, New Jersey.

EARN $40 weekly addressing envelopes. Instructions $1. Berckun, 2763 Linden, Knoxville, Tennessee.

MAKE new greaseless doughnuts in kitchen. Sell stores. Free recipes. Samuel Ray, 3605 South 15th, Minneapolis 7.

$10. HOURLY. Spare time. At home. Prepare tax returns. Simple, complete course. Details free. Box 2204, Hobbs, New Mexico.

FREE Book "505 Odd, Successful Businesses." Work home! Expect "Odd"! Pacific—37C, Oceanside, Calif.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The February issue closes on December 21. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 1255, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

23 BOOKS & MAGAZINES

SOCIALIST Books. Catalog, literature, Free. New York Labor News Company, Dept. F, 61 Cliff Street, New York 38, N.Y.

SPARETIME Profits Taking Subscriptions. All Magazines. Wholesale Catalog Free. Cassell Publishers, Westfield, N. J.

MEDICAL Books. All Subjects. Special Offer to Laymen. Reduced Prices. Write for Free List. Milbons Medical Book Company, 6643 Newgard, Chicago 26, Illinois.

NATIONAL Geographic Magazines 1888-1952. Any issue. Periodical Service. Box 465-PS. Wilmington, Delaware.

BOOKHUNTERS! All Subjects. Send Wants! Jaher Book Service. 183 Hazelwood Drive, Westbury, New York.

BOOK Catalog, 1000 interesting titles, send 10c. Books Publishing Company, Amityville 2, New York.

"DEEP Sea Digest." Trial Subscription $1.00. Oceanic Research, Miami 43, Florida.

WEBSTER'S Illustrated Dictionary. The ideal ready reference—827 pages, profuse illustrations, 60,000 up-to-date definitions. Completely revised; self-pronouncing; synonyms and antonyms. English grammar, postal information; weights and measures. Cloth. A $4.50 value. Send only $1.98 to Popular Science, Dept. 1255C, 353 4th Ave., New York 10, N. Y.

24 HYPNOTISM

FREE Illustrated Hypnotism. Selfhypnosis. Catalogue. Write: Hypnotist, 1324 Wilshire, Hollywood 17P, California.

HYPNOTISM! Party Demonstrations. Neige Diehl, Post Office Box 2002, Seattle, Washington.

HYPNOTIZE. 25 Lesson Course, $1.00. Techniques, 1514 West Eleventh, Brooklyn 4, New York.

FREE literature; Hypnotism, Autohypnosis, Mechanical hypnosis. Revealed by scientists. Hypni, Box 6097, Oklahoma City, Oklahoma.

MASTER Hypnotism in 25 Lessons, complete easily learned fascinating course in one volume. $1 postpaid in plain wrapper. Satisfaction or dollar refunded. Books Publishing Co., Amityville 2, New York.

TUITION our only business—failures sell gadgets and books. Home or resident courses. Details dime. Hollywood School, 6252 Woodman, Van Nuys, California.

"MECHANICAL Hypnotist," New 'Pocket-Size' invention causes trance simply, quickly. Also 32 page book—Command others. Stop harmful habits, entertain, instantaneous Hypnosis, etc. . . .$1.98. Must work or Money Back. Post-way, PS-12, 30 East 20, New York City 3.

EFFORTLESSLY Overpower others! Spellbinding record, "Trance Tutor," teaches hypnotism. Enslaves eyes, ears! $2.98. B. Grauer, 210 Fifth Avenue, New York 10-A.

EX-Ray mind. Hypnotize, one glance. Guaranteed. $3.00. Wamsteker, Ottery, Cape, South Africa.

STUDY Hypnotism! Amazing illustrated lessons. Big 280-page treatise jam-packed with fascinating information. Simple understandable language you'll enjoy. Full price only $2.95 postpaid—or C. O. D. Plus Postage. Satisfaction or refund guaranteed. Order "Hypnotism" today. Nelson Company, 210 South Clinton, Dept. 2MV-1, Chicago 6.

AUTOHYPNOSIS, Hypnotism Books, courses, Suggestion Records, Free Catalogs. Speedy Mailers, Appalachia, Virginia.

HYPNOTIZE Successfully! Learn easy, fast, modern methods—including secret nerve pressure technique (Guaranteed harmless)! Complete illustrated course $1.00. H. Fowler, 1252 Dahlia Lane, Wantagh, N. Y.

25 MAGIC TRICKS, PUZZLES, ETC.

3100 NOVELTIES, Tricks, Jokes, Gadgets, Funmakers, Hobbies. Catalog 10c. Johnson-Smith, D102, Detroit 7.

BEST magic. Joker's novelties. Lower prices. Catalog 10c. Top Hat, Evanston 13, Illinois.

FREE: Gamblers winnings exposed, Slot, Pinball, Dice, Racing. Purchase 10c catalog. Book, Box 671, St. Louis 1, Missouri.

500 TRICKS, Douglas famous Catalog, 10c. Fastest magic service for 30 years. Douglas Magicland, Dept. 2, Dallas, Texas.

BE a ventriloquist. All secrets Told. Make money, have fun, be independent. Send 35c for big new catalog. Includes short course in Vent, Dummies, Dummy Dialogues, Monologues. C. R. Gough, R. R. 3 Hartford City, Indiana.

LEARN Ventriloquism, easiest method, free particulars. Smith, 801 Bigelow, Peoria, Illinois.

BE a Magician! Large professional catalog of latest tricks. 35c. Ireland, C-109 North Dearborn, Chicago 2, Illinois.

FIRE eating. Professional method. 25c. Jos. Thompson, 1021 Mohegan, Pontiac, Michigan.

FREE 50c trick and $1.00 catalog. Send only 75c. Terry Magic Studio, 1921 66th Street, Brooklyn 4, New York.

"Svengali Deck" trick cards 50c with catalog. 1746-S Market, Philadelphia 3.

SENSATIONAL Magician's Wand (Vanishes Handkerchief!) 25c, catalog included. Box 1352-PS, Philadelphia 5.

"VENTRILLO" Professional Voice Thrower and Catalog 25c! Box 971-PS, Philadelphia, 5.

SMOKEBOMBS 25c, 7 for $1.00. (Terrific!) 4463-PS Greene, Philadelphia 44.

DOLLAR Magic Set Free with Catalog 25c. 4462-PS Germantown, Philadelphia.

26 COINS & CURRENCY

GET Profit and Pleasure in collecting old coins. Send 10c for 56-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, 374 Mehl Building, Fort Worth, Texas. Largest rare coin establishment in U. S. Established 55 years.

FREE! Foreign coin banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-50, Mass.

FREE! Bargain lists, United States Coins. Economy Sales, 158 Dean, Mansfield, Mass.

AMERICAN Coins! Stamps! Extensively! Sullivan, 127-DD East Fourth, St. Paul 1, Minnesota.

50,000 COINS, medals, bills. Lists free. Collectors Magazine 10c. Nagy, 8 South 18th, Philadelphia, Pa.

CHRISTMAS specials — complete sets bright uncirculated Roosevelt dimes $13.50; Jefferson Nickels $18.50; Franklin Halves $24.50; Whitman Folders 35c each; Premium Handbook $1.00; Retail Guidebook $1.75. Currency catalog $1.50; Giant Bargain catalog 35c. Bebee's, 4514 North 30th, Omaha 11, Nebraska.

Copyrighted material

COIN Magazine, 140 pages. Sample 30c. Numismatic, 7320 Milwaukee, Chicago 31.

INDIAN Cent with bargain lists 10c. Hutchinson, 3463 "I" Street, Philadelphia 34, Penna.

TEN Different Liberty Nickels $1.00. Sayers, 1000 East Unaka, Johnson City, Tennessee.

MORGAN Dollars; 1878-79-80-81-82 uncirculated $2.00 ea. Illustrated coin catalogue 25c. Shultz, Salt Lake 10, Utah.

EIGHT different Liberty Nickels $1.00. Five different Canadian Large Cents 50c. Six different U. S. Indian Cents 25c. Our price list of U. S. and foreign coins included with order. Bryson Stamp Company, 612 White, Toledo 5, Ohio.

CONFEDERATE Currency for sale. Free price list. Frank Trentham, 3207-D 35th, Lubbock, Texas.

$3,000.00 FOR 1913 Liberty Head Nickel. Dimes 1894-S, 1895-O, 1916-D. Quarters 1827, 1896-S, 1901-S, 1913-S, 1923-S, we pay $5.00 to $1,500.00. Certain dates—Lincoln Cents, $60.00. Indianheads, $60.00. Large Cents, $500.00. Eagle Cents, $200.00. 2c Pieces, $45.00. 3c Pieces, $60.00. Half-dimes, $500.00. Shield Nickels, $100.00. Old Dimes, $300.00. 1875 Canadian Quarter, $50.00. Hundreds of others worth $5.00—$500.00. Wanted—Half Dollars, Dollars, Gold Coins, Paper Money, etc. Know their true value. Our large illustrated Guarantee Buying-Selling Catalogue, giving complete allcoin information—send $1.00. Purchase catalogue before sending coins. Catalogue money refundable. Worthycoin Corporation, Leaders Numismatic Quotations (K-137-C), Boston 8, Massachusetts.

16 PAGE U.S. Coin List 10c. Stone Coins, 192-S Washington, Boston 8, Mass.

27 OLD STAMPS WANTED

STAMP collections, accumulations, U.S. Foreign, Gold, 62-95S Saunders, Rego Park 74, N.Y.

28 STAMP COLLECTING

200 DIFFERENT, including Roosevelt triangle, 10c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

"WOW! 153 All Different Germany, 10c" Zeppelins, Semi-Postals, Airmails, High Values. Big Bargain lists and approvals included. Jamestown Stamp, Jamestown 509, New York.

TWO $5.00 US stamps plus 20 different, 10c with US approvals. Irwin Stamp Co., Box 1109, Brooklyn 30, New York.

WEIRD Diamond Shape Coffee Stamps, lovely Flower Triangle. First American Big Commemorative, Greenland Idol Dancer, etc. Free with approvals. Capital Stamps, Little Rock 10, Arkansas.

AMAZING Offer! 200 U.S. stamps—including commemoratives, airmails, high denominations to $1.00—only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

300 DIFF. World wide 25c. Plus surprise packet. Mammoth packet list free. Econopackets, Box 168, Riverside 22, Calif.

FREE!! Giant Catalog Offering thousands of bargains sent with beautiful approvals. Jamestown Stamp Co., Jamestown 613, New York.

ADD 10,000 different stamps of the World to your collection for less than ½c each. $5. down, $4.25 month brings you book of 1000 each month for ten months. I. Huppert, 1972 East 18th Street, Brooklyn 29, New York.

50 DIFFERENT U.S. 5c with bargain approvals, lists. Bookman, Box 8245-S, Madeira Beach, Fla.

NUDE, pioneer, animals packet (with approvals)—10c. Atlas, Eisenhower, Racine, Wisconsin.

FREE—Complete set of Famous Americans, Flags, Parks and Presidentials to approval buyers. Send 5c for 15 of the above stamps plus full particulars. Triboro Stamp Company, 145 Nassau Street, Dept. 212, New York 38, N. Y.

U.S. Classics—Over 50 Yrs. Old. 15 Selected oldtimers. Missing in biggest collections. All 15 at less than 1c each. 10c with approvals. Jaro, Box 246-P, New York 8.

WORLDWIDE, 50 all different, absolutely free, just to introduce our incomparable approvals. Kent Stamp Company, GPO Box 87, Brooklyn, New York.

FREE Stamp Collection:—100 different stamps from Europe, Africa, Asia, Scandinavia, Balkans, etc. 3c to approval applicants. Tatham Stamp Co., Springfield 50, Massachusetts.

225 STAMPS For only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange Countries cataloguing up to 25c each! Also Approvals. Mystic Stamp Company, Camden 55, N. Y.

100 DIFF. Latin America 25c, Packet list Free. Econopackets, Box 168, Riverside 22, Calif.

FREE! Catalog! About stamps. Illustrated. Free! The Stampmart, Hartford 1, Conn.

FREE!! U.S. Price catalogue (Order today). New-Way Stamp, Lawrence, Massachusetts.

GREATEST Premium! World-wide collection! Over 1000 Different Stamps from Aden, Nigeria, Corea, Macao, other exotic lands. Includes triangles, airmails, sport, animal, ship, map stamps. Catalog value over $25.00. This exciting collection Given to approval customers. Request approvals, details, today. Odd Stamps Co., Dept. B-2, Box 31, Redondo Beach, Calif.

BRITISH Colonial collection-Hivalues, Commemoratives. Free to approval buyers. Pleasure Stamps, 1865A—52nd, Brooklyn 4, New York.

WHY Pay More? Pick stamps from our large collections. 2c each. Just as purchased. Be first. Premiums given. U.S. also available. Roseland Stamp Co., Dept. B-35, Spring Lake, Mich.

FREE—Stalin Giant "Iron Curtain" Set. Approvals. Seminoles, Dayton, Tenn.

CANADA—Newfoundland collection including early issues, commemoratives, pictorials and high values. Plus set of fascinating triangle stamps. Plus set of unused British Colonies. Plus large stamp book. All four offers free. Send 10c to cover postage. Empire Stamp Corp., Dept. PR, Toronto, Canada.

DEALERS Wholesale catalog. Postage 3c. Franksco, 5031 Queensbury, Baltimore 15, Maryland.

513 DIFFERENT Worldwide from Haiti, Sudan, Libya, etc., cataloging over $10 only 35c. Approvals. Littleton Stamp Company, Littleton Q2, New Hampshire.

PICTORIAL Angola, Mozambique, Hungary, a beautiful assortment of stamps, 3 sets depicting wildlife in color, plus 100 attractive stamps. 10c to approval applicants. Modern Stamp Co., Dept. B-1, Ferrysburg, Mich.

FREE 107 British Colony Stamps! Yes! All Different from Britain's far flung Colonial Empire. Catalog value over $2.25. Free stamp magazine. Approvals. Send dime for handling. Act today. Niagara Stamp Co., St. Catharines 72, Ontario.

FREE—1,000 Different Stamps to approval applicants becoming customers. Enclose 6c postage. Sobel Stamps, 4333 N. Drake, Chicago 18.

DIFFERENT, Canada: 100, 48c; 150, $1.45; 200, $2.95; 250, $6.95. Newfoundland: 40, $1.00; 50, $1.85; 75, $4.10. Richard Timm, 368 Gloucester, Ottawa 4, Canada.

100 DIFFERENT U.S.—50c. Approvals. Utechts, 1143A N. Keeler, Chicago.

PICTORIAL Packet from Antigua, Barbados, British Guiana, British Honduras, Burma, Curacao, Leewards, Rhodesia, Trinidad, Tobago, and many other hard to get countries. Bi-colors, topicals. Tremendous value. Each stamp a beauty. 10c with inexpensive, attractive approvals. Wolverine Stamps, Dept. B-27, Fruitport, Michigan.

FREE: Mint British colonies from Brunei, Papua, New Guinea, Caymans, Gilbert Ellice, Seychelles, Sarawak, Grenada. Free with approvals. Viking, Great Neck 5, N. Y.

525 DIFFERENT World 40c to approval applicants. Northwest Stamp Service, Box 37, University Station, Seattle 5, Wash.

$1.00, $2.00, $4.00, $5.00, U.S. Free with requested approvals. Southern Stamp Company, Box 70, Miami 1, Florida.

SUPERIOR worldwide mission mixture. Amazing variety! Half pound only $1.50. Bay Nielsen, 4545A Harvard, Montreal 28, Canada.

PENNY approvals by country. M. H. Hoerning, Merriam, Kansas.

GIGANTIC 1956 U.S. catalog 25c (refundable). Dale's, 530 Garden, Bellingham, Washington.

BUY wholesale! U.S., British, Latin price lists, $1.00 refundable first order. Miami Stamps, Box 707, Coconut Grove 33, Florida.

350 DIFFERENT Denmark $4.00. Larsen, Gustavjohansensvej 7, Kobenhavn F., Denmark.

ECONOMICAL ½-1-2c Approvals. 22,000 varieties available. Dresel, Box 270-T, New York 25, New York.

GIANT Approvals Thousands Different! 1 and 2c. Wahl's Stamp Exchange, 7008K Farragut, Chicago 31, Ill.

BRITISH West Indies. Quality Approvals. Rahmer, Box 123S, Rome, N. Y.

FREE U. S. illustrated bargain catalogue. Rothberg, Box 60, Boston 1, Mass.

50,000 STAMP grab-bags, 25c each. Anderson, Box 1, Reading, Pennsylvania.

14,000 DIFFERENT yours on our streamlined, systematic Club plan for only 50c weekly. Big shipment every two weeks. Details free. Sjoquist, Box 217, Valley Stream 70, New York.

30 DIFFERENT commemoratives. 1893 up. 10c U.S. Approvals. K & B, Box 5, Brooklyn 14, N.Y.

ZEPPELIN set free with approvals. Variety Stamps, 57-S Circuit, Newton Highlands 61, Mass.

OLD scarce U. S. seconds on approval. Slightly defective, bargain prices. Hearnfeld. Clintonhill Station, Newark 8, N. J.

WONDERFUL Offer Seven complete mint sets only 10c with approvals. Reich (S26), 1033 Lawrence, Chicago 40.

100 FOREIGN, 20 U.S. Commemoratives, 10c. Approvals. Weckerling, Box 442R, La Feria, Texas.

FREE. United States Plate Block List Simmyco, Box 63, Mattapan 26, Mass.

EXCLUSIVE! U.S. Mint plate number block topical collections. Five different Western Settlements special $1.00 with approvals. Wm. Kuehl, 3125 East K, Tacoma 4, Washington.

FREE! 15c stamps. Pick your approvals. Novelty Approvals, 1127 Manor Avenue, Bronx 72, New York.

FREE Sample—Interesting, informative, illustrated! National Stamp News, Anderson, South Carolina.

UNITED States commemorative collection containing 33 different—10c approvals. White, 516-W Avenue L, Brooklyn 30, New York.

500 WORLDWIDE 50c. Handsome approvals. Attractive premiums. Faith, 1225 Campbell, Alhambra, California.

FREE stamp album! Serious approval applicants sending postage. Adventure, Buckland, Connecticut.

U.S. 40 DIFFERENT 10c. 40 different Commemoratives 20c. Both 25c. Bargain lists. No approvals. Seidenberg, Appleton, Wisconsin.

FREE! Set Flower Triangles, Rhineland, Anchal, Others. Approvals. Delton Page, Box 201P, East Paterson, New Jersey.

UNITED States. Fine Mint Airmails. #C7, #C8, #C9, #C10. Only $1.00. Approvals accompany. Whiton Paine, Westport 12, Connecticut.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

BETTER grade Approvals. High catalogue values. E. M. Remley, 341, Mount Dora, Florida.

EARLY U.S.! #26 issued 1857 plus 20 other nineteenth century 25c to approval applicants. AAA Stamp Company, Arcade Building, St. Louis 1, Missouri.

NO Approvals—205 stamps from 25 countries $1.00. Bonder, Ellenville 7, New York.

SOUVENIR Sheet Russia 1937 10c with approvals. Kingman Stamps, 30 Empire, Yonkers 4, New York.

WILL Send you 20.000 collection, ½c to 3c, many free. Cut Rate, Blue Springs 4, Missouri.

100 DIFFERENT Finland 25c with approvals. Corzine Stamps, 19620 Lamont, Detroit 34, Michigan.

BEAUTIFUL, bicolor, pictorial large or airmail Only. U.S.A., Br. Colonial, Fr. Colonial, Many others. $2.50 value 50c; $1.05 value 25c; 35c value 10c for approval applicants. Nevin Otis, San Andreas, Calif.

THOUSANDS of Exciting Stamps, All Different, Yours for 1c, 2c each. Fill your Album for Pennies! Big Collection Sent for Free Examination. Cole, 43-G Rinewalt, Buffalo 21, New York.

FIVE Nicaragua New Pictorials mint 5c with approvals. Gobie Approvals, 931 Emwell, Ferndale 20, Michigan.

CORONATIONS, Triangles, Animals, Sports. Free with Approvals. Exotic, Box 482-S, Coral Gables 34, Florida.

SPECIAL 25 Different U.S. Commemoratives, plus 10 different foreign sets, 10c. Approvals. Farmer Stamps, 6919 Camrose, Los Angeles 23.

APPROVALS, Inexpensive, Worldwide; Crown Stamp, 1405 West Magnolia, Burbank, Calif.

2-M-S-L lifts stamps from envelopes—two minutes. $1.00. Nicholson Company, 3413 Cahuenga, Los Angeles 28, California.

PENNY Approvals jammed with Bargains. For better values, try Putnam Stamp Company, Mahopac, New York.

100 DIFFERENT Belgium 10c. Durham, 1021 North Granger, Saginaw, Michigan.

CORONATIONS. 10 different only 10c with approvals. Seminole Stamps, Box 1138-S, Coral Gables 34, Florida.

BE Smart—Stop paying high retail prices—Approvals at wholesale. Write for details. Bargain Stamps, Redlands, Calif.

50 COUNTRIES! Stamp Collection from 50 Countries only 10c to approval applicants. Quality Stamps, 178 Sweet, Buffalo 12, New York.

ISRAEL 50 different $1.00. British-Empire, 200 Different 80c. Robern, Shirley, New York.

FREE four wonderful Triangles, approvals. Woodward, 716 Valencia, San Francisco, California.

FREE United States price list. Carlos Elbert, 31450 N. River Road. Mt. Clemens, Michigan.

BE Smart stop paying high prices, Approvals at wholesale. For details write Tru-Value, Box 2098, Santa Ana 1, California.

NEW! Steel cabinet holds 1500 first day covers. $15.00! Lock $2.50 extra. Compact! Perfect for stamp duplicates No cash needed! Swap your surplus stamps for Christmas Gifts for home, office, school. Free catalogs. Trinity Stationers, 116 Greenwich St., New York 6.

ASTONISHING Gift, 40 US with superior approvals. Send 5c for postage. Sparta, Box 1082, Rochester, New York.

25 DIFFERENT U.S. Commemorates 10c with approvals. R. Werner, 1844 W. 5th St., Davenport, Iowa.

1500 MIXED foreign stamps $1.00. No Approvals. Aaron, 789 Valencia, San Francisco 10.

FREE—German War Issues B200-91, cataloging $9.62, to approval buyers. Details 10c. Royal Stamp Company, Tamaqua 2, Penna.

CIPEX souvenir sheet plus 25 different U.S., 10c. Approvals accompany. Village Stamps, 90-39B 214 Street, Queens Village 28, New York.

ABYSSINIA to Zanzibar including Zoo, Flowers, Fish, Butterfly and multitude others. Everything 10c with approvals. Enormous bargain. Jubilee, Box 504, Baltimore 3, Maryland.

BIG stamp finder and catalog, only 15c to approval applicants. Itasca Stamp Exchange, Box # 758, Itasca, Illinois.

25 DIFFERENT Egypt 5c with exciting approvals. Mountain Lakes Stamp Company, Mountain Lakes, New Jersey.

FREE U.S. catalogue. Contains almost 1.000 illustrations; over 10,000 delightful bargains. Stone, 192-S Washington, Boston 8, Mass.

UNBELIEVABLE! Africa, Asia, Latin America, set Triangles, Also 100 different 10c with approvals. Bennett, Candor 2, New York.

ROOSEVELT "Death" Issue, set Gamblers triangles, 25 others, 3c. Approvals. North Star, Granada, Minnesota.

25 DIFFERENT Cuba 25c. Approvals. Erv's, 802 North Central, Marshfield, Wisconsin.

GREAT value. 6 mint Monaco Triangles. 10c. Approvals. Bruce Stamp Company, 64-46D 214th St., Bayside 64, New York.

1956 U.S. Catalog 25c. Approvals. Gatewood, Box 346, Winston-Salem, North Carolina.

200 DIFFERENT Including Macau, Rhodesia. Mauritius. 10c to approval applicants. Evden, Box 128, Valley Stream 42, New York.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The February issue closes on December 21. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 1255, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

29 ANTIQUES, RELICS & INDIAN GOODS

STAYSCHUNeyedentiefeekayschun—Illinois. Selling 600 historical firearms, 30,000 prehistoric, stoneage Indian Relics, Collectors Cartridges, Confederate Money, Coins—Revolutionary, Civil, Indian-Wars Flintlocks, Muskatoons, Swords, Bayonets, Bullet Molds, Powder Flasks—Blunderbusses, Pepperboxes, Kentucky Rifles, Winchesters, Buffalo-Stagecoach Carbines, Frontiers, Derringer, Duelling Pistols, Matchlocks. — Arrowheads, Tomahawks, Bannerstones, Gempoints, Spearheads.—Steer-Deer-Buffalo Horns, Mounted Pheasants, Quails, Squirrels, Deerheads.—Agates, Fossils, Mineral Specimen, Lapidary Supplies. — Daguerreotypes, Gold Dollars, Bo-wood, Blo-horns, Violin Wood, —Send 35c for profusely illustrated catalog. Heike, Cabincreek, Wenona, Illinois.

ARROWS: Thirty, assorted colors $5.00. Book-Relic Catalog 25c. Tilton Relics, Topeka 10, Kansas.

4 FINE Arrowheads $1.00. Spearhead $1.00. List free. Lear's, Glenwood, Ark.

4 FINE Indian Arrowheads $1.00. Beautiful Drill $1.00. List Free. Arrowhead, Box 5283, Indianapolis 1, Indiana.

30 MINERALS & PRECIOUS STONES

HIGGENS' Gems & Minerals. Finest quality. Free price list. 2117 Park, Salem, Oregon.

URANIUM Mineral Pitchblende sample $1.00. Homogeneous Co., Box 703, Coatesville, Pa.

GEMSTONES, Mineral specimens for cutters and collectors. Every variety. Lowest prices. Free catalog. Plummer's, 4720 Point Loma Avenue, San Diego 7, California.

GEMCUTTING — Silvercraft. Illustrated Magazine tells how to cut gems, make jewelry. 150 ads illustrating equipment, gems for collectors, cutters. Free literature. Lapidary Journal, Del Mar 1, Calif.

HANDBOOKS for rockhounds. Free list. Minbub—Box 3114, Station "A", Spokane 17, Washington.

SAPPHIRE, Topaz, tourmaline, garnet, peridot. Five uncut gem specimens, $1.00. Ten polished gems, baroque shaped, $1.00. Free big bargain list jewelry, gems, profitable, easy, do it yourself projects. O'Brien's, 1116B Wilcox, Hollywood 38, California.

URANIUM sample in petrified wood good test specimen $1.00 Postpaid. T. Skookos, Box 151, Kanab, Utah.

BEAUTIFUL South Seas catseyes fully polished $1.00 pair. Gemco, Eisner Avenue, Sheboygan, Wisconsin.

LARGEST gem and mineral magazine tells how to have profitable fun with rocks, gems, jewelry. Monthly, $3.00 year. Sample 25c. Gems & Minerals, Dept. S12, Palmdale, Calif.

AGENTS, Geiger-Scope lights up. $3.98 prepaid. Sample uranium ore, pouch, instructions. Geiger-Scope, Hillsboro, Ohio.

ROCKHOUNDS! Trips every issue. Subscribe! Dollar: "Prospector's Gazette," Bellflower 51, California.

31 HOBBIES, COLLECTIONS

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E, 631-E St., N. W., Washington 6, D. C.

65 ASSORTED Army Patches, Insignias, Ribbons, $1.00. Surprise included. LHGCO, 19 East 16th Street, New York City 3.

HISTORICAL documents—(reproductions)—$1.00 each. Howard Sawyer, 5813 Benton Hghts., Balto. 6, Maryland.

KLONDIKE Novelty jewelry findings assorted, beads, Pearls, Jewels, 5 lb. lots $7.50; Sample $2.00 lb. Merchandise, 19-B East 16th St., New York City 3.

100 MILITARY Official shoulder patch insignia. Free album. $5.00. All different. Wolf Appleton, Inc., 566-E Broadway, New York 12.

GENUINE Nazi medal $1.00; 37 different American emblems $1.00; Catalog 10c. Insignia Club, 550-A Fifth Avenue, N. Y.

OPINION survey wanted. Dahl—PSB, 601 Iona, St. Paul 13, Minn.

MILITARY Miniatures: U.S. Marines, American Revolution, Civil War, Custer's Cavalry. Illustrated Catalog 25c. Bussler Miniatures, Dept. E, 40 Howe Street, Quincy 69, Mass.

UNUSED matchbook covers—100 different $1.00—36 page catalog 25c—matchcover album $3.00. Charles Edelman, 1311P East 84, Cleveland 3, Ohio.

NAZI Medals, Ribbons, Flags, Daggers. Big Introductory Packet $1.00. Illustrated Lists. Medcrafts, 1923 34th Street, S. W. Calgary 3, Canada.

GROW giant crystals! Free booklet. Crystocraft, Box 35, College Station, Texas.

STATE Souvenir decals brilliant colors 20c. Box 17, Nyack, N.Y.

POST card collecting! Profitable Fun! Learn all! Magazine, $2.00 year; Current issue 25c; Box 432S, Glendale, California.

COLOR Slides, 2X2, Trains, Fire Engines, Antique Automobiles, etc. Illustrated Catalog Free. Universal, Box 779J, Beverly Hills, California.

32 PHOTO FINISHING, PHOTOCOPIES, ETC.

PHOTOGRAPHY For Pleasure or profit. Learn at home. Practical basic training. Long established school. Free booklet. American School of Photography, 835 Diversey Parkway, Dept. 1746, Chicago 14.

SURPRISE gift with first roll developed. 8 jumbo superpak album prints or 16 contact prints 40c. 12 exposure roll 50c. Certificate for 3—5x7 enlargements. Dept. B-14, Owl Photo Co., Weatherford, Okla.

FREE 5"x7" introductory enlargement with roll. Finest quality Jumbo dated prints in handy Super paks. 8 exposures 35c; 12, 55c. Globe Photo, Dept. PS, Box 3508, St. Paul, Minnesota.

4 X 6 OR 3¼ X 4½ oversize glossy prints. 8 exposures 40c, 12 exposures 60c, 16 exposures 80c. Hagner, 1318 West Columbia Avenue, Philadelphia 22, Penna.

Copyrighted material

SPECIAL Introductory offer 8 Jumbos 25c, 12-35c. Western Photo, PS-125, Box 298, San Francisco 1, Calif.

ROLL Developed and 5x7 glossy prints. 8 exposure 80c; 12 exposure $1.20. Hagner, Dept. B, 1318 West Columbia, Philadelphia 22, Pennsylvania.

8—12 EXPOSURE rolls 39c, jumbo prints. Free 5x7 enlargement with each roll developed. Guaranteed work, one day service. Lincoln Studios, Dept. L, Box 13, Lincoln, Nebraska.

33 MOTION PICTURES, SLIDES SOUND EQUIPMENT

MOVIE Camera Film 8 mm roll $1.50. 16mm 100' $3.00. Free processing. Better Films, 742 New Lots, Brooklyn, N. Y.

TAPE Recorders, Tapes, Accessories. Unusual Values, Dressner, Box 66, Peter Stuyvesant Station, New York 9.

SAVE 50%! Guaranteed-fresh color, b&w movie film! 8mm, 16mm. Free catalog! Eso-H, 47th Holly, Kansas City 12, Mo.

FREE! Blackhawk's big sale catalog new and used 16mm., 8mm. films; 2"x2" color slides; used 16mm. sound projectors. Biggest stock in USA. Blackhawk Films, 1201 Eastin, Davenport, Iowa.

TAPE recorders wholesale! Free bargain catalog! Towers, Box 155, Philadelphia 5.

KEYSTONE Kops Comedy The Knockout. 8mm prints $18.00. Film Classic, 1611 North LaBrea, Hollywood 28, California.

WORLD'S largest selection of films, Free bulletins. Specify 8mm.—16mm., silent or sound. Dept. F4, Peerless Camera, 415 Lexington Ave., New York City 17.

TAPE Recorders, tapes; wholesale prices. Korstan, 215 E. 88, New York City 28.

"BEAUTIFUL" Color Slides and Movies. Sample 10c. Eddings, Corning R-3, New York.

THRILL to slides processed from your favorite pictures or negatives. For trial write Thirty-five Slides, Box 279-S, Green Mountain Falls, Colorado.

HUGE listings, color, B&W sports, comedies, travel, musicals, etc. Catalog 15c. Turke Films, 423 S. Lincoln, Hinsdale 1, Illinois.

5,000 8-16MM. Silent-Sound Films. International. 2120 Strauss, Brooklyn 12.

16MM Sound Projectors and Films. Bedner, 5300 So. Talman, Chicago.

FREE catalog—8-16mm. Film now available. Best Rite Sales Co., P.O. Box 357, Times Square Station, New York 36, N.Y.

34 CAMERAS, PHOTO SUPPLIES

BASS Says: Quality Cameras Since 1910. When in Chicago visit the Camera Cross Roads of the World . . . or write us for your favorite equipment, new or used. Satisfaction Guaranteed. Bass Camera Co., Dept. AG, 179 W. Madison Street, Chicago 2, Illinois.

BUY wholesale nationally advertised cameras, photo supplies, thousands other products at big discount. Free "Wholesale Plan." American Buyer's, Hertel Station, Buffalo 16-P1, N. Y.

PHOTOGRAPHY For Pleasure or profit. Learn at home. Practical basic training. Long established school. Free booklet. American School of Photography, 835 Diversey Parkway, Dept. 1726, Chicago 14.

20 TO 50% Discount everything photographic, giftware. Free catalogue. Dart, 3812F Atlantic Avenue, Brooklyn 24, N. Y.

MIDGET spy camera, 2x1¼, complete with case, films; only $2.49. DS Enterprises, 172-35B Henley Road, Jamaica 32, N.Y.

DO you own a good camera without internal Flash Synchronization. Modernize with built-in synchronization. Information on request. Repair service on all photographic equipment. Associated Camera, 107 Seneca St., Seattle, Wash.

NEW Argus automatic projector $48.90. Shick custom shaver $14.95. (Regularly $28.50). Terrific discounts photo equipment appliances. Free catalog. Mailers Mart, Box 135-P3, New Rochelle, New York.

FREE! Free! Free! Central Camera Co., Photographic Headquarters since 1899, saves you money on all photographic equipment. Send for Central Camera Co.'s Free Photographic Bargain List today: Central Camera Co., Dept. 12-C, 230 S. Wabash, Chicago 4, Ill.

HANDS Unsteady? For movies, Stills, try "Pocket-Pod" (not a tripod). Carry it in your pocket. $1.00. Box 371, Troy, Ohio.

TAKE Better Pictures! 256-page "Everybody's Photography Manual" shows you how to take better pictures. Over 750 illustrations; new facts on films, cameras, developing, home movies, accessories, more! Only $2.49, satisfaction guaranteed. Popular Science, Dept. 1255C, 353 Fourth Avenue, New York 10, N. Y.

35 MUSICAL INSTRUMENTS, SONG WRITERS & RECORDS

ACCORDIONS—Direct from importer—save 50% and more! Free trial. Lifetime guarantee. Trades accepted. Free Catalog. Write Accordion Outlet, Dept. 125-P, 2003 Chicago, Chicago 22, Illinois.

WANTED! Poems for musical settings. Write Songwriters' Service, Clifton, N. J.

SONGWRITERS! Protect your poems and songs! Don't mail anywhere! Write for safe procedure! Song Service, 333 W. 56th, Dept. P.S., New York 19, N. Y.

POEMS Wanted for New Songs. Send poems. Immediate consideration. Crown Music Company, 1472-P Broadway, New York City 36.

POEMS needed for new songs. Send poems for free examination, details. Immediate consideration. Songcrafters, 2724 Arcade Station, Nashville, Tenn.

SONGWRITERS: Large recording company wants new songs. Royalty basis. National sales, promotion if selected. No charge for melodies. Send songs, song poems. Music Makers, Dept. G-16, Box 2507, Hollywood, California.

FREE Records of your song—Your words—My Melody. Free information. Johnny Mack's Melody Mart, 1094 West 39th Street, Dept. K, Los Angeles 37.

SONGS—Poems wanted. Good opportunity. Hollywood Tunesmiths, 1609 Vista Del Mar, Dept. N, Hollywood, California.

POEMS Wanted for musical setting by America's Largest Songwriters Organization. Immediate consideration. Five Star Music Masters, 646 Beacon Bldg., Boston.

SONGPOEMS and lyrics wanted. Mail to: TinPan Alley, Inc., 1650 Broadway, New York 19, N.Y.

WHOLESALE Catalog! 30-80% Discounts! Appliances, Musical Instruments, Typewriters, Phonographs, Watches, Jewelry, Recorders, Housewares, etc. Consolidated Distributors, 21-81 Lafayette, Paterson 15, New Jersey.

SONGWRITERS! Send poems, songs. Music Service, 243 West 72nd St., PS, New York 23.

PHONOGRAPH Records Cheap. Catalogue. Paramount, SC-313 East Market, Wilkes-Barre, Pennsylvania.

ACCORDION Repair Guide, illustrated, indexed, explains making reeds, bellows, fingerboards, basskeys, tools, repairs. Worth its cost a hundred times. Send $3.00. Alfred Fischer, Box 402, Bellingham, Washington.

SONGS Into $$$$$—Share $29 million dollars yearly for New Songwriters, songpoets. Songs composed, published, promoted by largest firm. Information, appraisal Free. Send to Nordyke Publishing Company, 6000 Sunset Blvd., Hollywood 28, PS, California.

POEMS, songs wanted! Free examination. Bengal Music, 93 Jefferson, Chelsea 50, Massachusetts.

1955 ACCORDIONS — Wholesale. Free catalog. American Accordion Center, PS-12, 5329 Belmont, Chicago.

36 RADIO, TELEVISION, SUPPLIES & EQUIPMENT

MAKE Simple, Tubeless, Batteryless, Distance-Getting radio. Genuine Melomite crystal, Detector, Illustrated instructions. 50c postpaid. Allen, 427-PS5, Clinton, Mo.

REPAIR your own TV. Instructions compiled exclusively for your set. Simple as replacing light bulb. Send set name, chassis, model number. $2.00. LS Engineering Co., Box 4113-PS-12, North Hollywood, California.

TV Trade-In Sets. Philco, R.C.A., Emerson, others. List available. 10"—$17. 12" to 17"—$20 up. Washtek Service Co., Dept. S, 956 Southern Blvd., Bronx, New York.

NEW! Printed circuit television antenna, smaller than a transistor. Only $1.98 Postpaid. Ekeradio, 646 North Fair Oaks, Pasadena, Calif.

CASH Paid! For unused electronic tubes. All Types. Any quantity. Highest prices paid or will swap. Send list to: P. S. Gensler, W2LNI, 512 Broadway, New York 12, N. Y.

RADIO Tubes, surplus radio equipment, bargains. Ask for list. Kay Electronics, Box 25, Hollis, New York.

FREE 324 Page 1956 Television—Radio—Hi-Fi—Electronics Catalog! World's largest stocks, lowest prices. Everything for experimenters, builders, amateurs, servicemen. Latest build-your-own kits, Hi-Fi, phonos, recorders, P.A., TV accessories. Thousands of parts, tubes, test instruments, tools and books. Write for Free copy! Allied Radio Corp., 100 N. Western Ave., Dept. 31-M-5, Chicago 80, Illinois.

BUILD Cigarette Case Radios, 4 plans, $1.00. Cook, 4003 Roosevelt, Midland, Texas.

GEIGER Counter and Metal Detector Kits. Inexpensive, Educational. Free Literature. Electronic Applications, 5024 Lee Highway, Arlington 7, Virginia.

SUN Battery $2.50 Free details. Strong, 601J El Centro, South Pasadena, Calif.

NEW germanium diode, variable condenser crystal radio kit $2.95; Phone $1.75; New catalogue. Clearco Crystal Company, Box 1857, Milwaukee, Wisconsin.

CRYSTAL Radio Experimenters. Write Leslie Hulet, 305 Hope, Lakewood, New Jersey.

REPAIR Diagrams Radio $1.00, Television $2.00. Give Make, Model. Diagrams, Box 672-PS, Hartford 1, Conn.

FREE Television and Radio Troubleshooting Manuals and Descriptive Literature upon request. Build 16 Radio Circuits, using Printed Circuitry as well as professional Punched Metal Chassis. "Edu-Kit" includes all Radio Parts, Tubes, Instructions, Tester, Soldering Iron, Quizzes, Free Consultation Service—only $19.95 complete. Progressive "Edu-Kits" Inc., Room 36A, 497 Union Ave., Brooklyn 11, New York.

TV trouble shooter reveals tubes causing faulty reception $2.00. Maddock, 1354 Boxwood Circle, Norfolk, Virginia.

TV Interference Trap. Adjustable. Eliminates interference, ghost, etc. Easily installed. Money back guarantee. $2.50. Antenna Service, 44 N. Madison, Pasadena, California.

GUARANTEED simplified TV Trouble Shooter automatically pinpoints faulty tubes. $1.00. Stern, Box 42-A, Hillside, New Jersey.

WALKIE-Talkie. Build wireless two-way portable radiophone for less than $10.00. Plans 50c. Springfield Enterprises, Box 54-A12, Springfield Gardens 13, New York.

RADIO AND HI-FI make your own! New 256-page book "How To Build Your Own Radio and Hi-Fi Sets" is crammed with crystal-clear step-by-step instructions for building Hi-Fi amplifiers, preamplifiers, FM tuners, short-wave sets, auto radios, much more! Hundreds of show-how photos, diagrams. Only 99c—money back guarantee. Popular Science, Dept. 1255C, 353 Fourth Avenue, New York 10, N. Y.

37 BUSINESS OPPORTUNITIES

START A Buying Service, buy wholesale thousands nationally advertised products. Make big profits selling at sizeable discounts. Postcard brings details. American Buyers', Hertel Station, Buffalo 16-N1, N. Y.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

ENVELOPES addressed accurately, reasonably. Fast service. We have capable addressers in your city. Glenway System, 5713 Euclid, Cleveland 3, Ohio.

"MAKE Perfumes", other products—Sell mailorder. International, 6347 Parnell-PS-12, Chicago 21, Illinois.

IMPORT-Export! Opportunity, profitable, world-wide, mail-order business from home, without capital; or travel abroad. Established World Trader ships instructions for no-risk examination. Experience unnecessary. Free details. Mellinger, E691, Los Angeles 24.

MEN Wanted—Build Luggage And Cases At Home. We sell your products—supply complete instructions, materials, everything. No special equipment needed. Free details. Casecraft, 805-H Sunset, Los Angeles 12, Calif.

WE Love our mailman. He leaves over $1,000.00 monthly in our rural mailbox. My college professor husband drafted a scientific home mailorder method. We bought a Texas ranch, live as we always wanted. Now we sell the "Ranch Mailorder Method." Operates anywhere. Inquire: Eveningshade Ranch, Helotes, Texas.

$1,000 MONTHLY possible in collection agency business. Free details. Write Cole Associates, Syracuse 2, New York.

GROW Orchids at home—profitable—fascinating. Year 'round. Maine to California. No Greenhouse. Gorgeous Cattleyas, Cymbidiums, etc. Successful home grower shows you how. Free—full details. Flowerland, 4622 Wilshire, Los Angeles 5.

OPERATE profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

VENDING Machines—No Selling. Operate a route of coin machines and earn amazing profits. 32-page Catalog Free! Parkway Machine Corporation, Dept. 73, 715 Ensor St., Baltimore 2, Maryland.

$25 WEEKLY working two hours daily at home. Lycke, Box 2471-B, Cleveland 12, Ohio.

BRONZE Baby Shoes. Instructions, Equipment and mountings for genuine electroplated process. Free catalog. Hollywood Bronze Supply, Dept. B-1, 1624 East First Street, Los Angeles 33, California.

MEN.—Income from local information. No selling. Neherco, LaVerne 6, California.

NEWEST Spare, Full-Time Home Business. $5 to $10 hour possible. Paint with suede—the finish with touch And eye-appeal. Beautify auto dashboards, signs, radios, toys, figurines, lamps—1001 others. Complete, Step-By-Step Instructions sent for no-risk examination. Free details. Coast, Los Angeles 61.

BE appointed state notary public now. Write—Stationers, Helotes, Texas.

YOUR Own name brand business. No investment; no inventory. Part time or full time. Sell famous brands of appliances, housewares, silverware, radios, vacuum cleaners, lamps, tools, clocks, watches, jewelry, etc., etc., over 1,000 items. Join thousands of successful independent dealers. Send for Free catalog and dealer price list. H. B. Davis Corp., Dept. F, 145 W. 15 St., New York City.

FIX Typewriters Inexpensive home course teaches Factory Secrets. Free Booklet. Write, Typewriter, Tarentum 2, Pennsylvania.

$200 WEEKLY Cleaning Venetian Blinds. Free book. Burtt, 2434B, Wichita 13, Kansas.

$1,000 MONTHLY, home, mailorder, free advertising method. Revealing information. Seidel, 6000-BL Sunset, Los Angeles 28.

LIQUID Rubber makes flexible molds. Free Sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

WANT To Make Big Money At Home? $5 profit in an hour possible with Invisible Reweaving. Make tears, holes disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details Free. Fabricon, 8338-S Prairie, Chicago 19, Illinois.

GOOD paying business silvering mirrors, plating articles in the shop and home by late method. No tanks or shop required. Free booklet. Gunmetal Co., Avenue E, Decatur, Illinois.

LEARN Sewing Machine Repair. How to make "Big Money" at home sparetime. New machines—"Everything"—Supplied. Write Taylor Service, Box 2126, San Bernardino, California.

BREED Rare Tropical Fish at home. Earn Big Money! Learn Secrets! Help fill huge demand. Amazing Opportunity! Free Plan. Tropical Fish Breeders, Los Angeles 61, Calif.

$70 WEEKLY—Home, spare time. Simplified mail bookkeeping. Immediate income—easy! Auditax, 34757DZ, Los Angeles 34

METALIZE Baby Shoes, jewelry, gifts. Free Catalog. Kiktavi, Box 73136, Los Angeles 3.

POPCORN and Potato Chip Equipment. Eakins, Box 933-B5, Springfield, Ohio.

HOW and where to obtain Capital? Free details. Star Service, Wapakoneta, Ohio.

EARN Up To $2000.00 monthly with spare or full time route of automatic 3 in 1 Hot Drink Merchandisers using Maxwell House Coffee, Bakers Chocolate, Tenderleaf Tea, in your community. We train you. $1190.00 starts you. Write Superior, 4555-BG East Warren, Denver, Colorado.

ADVERTISING book matches—Cash in on big demand—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash Commissions. Superior Match Co., Dept. PX-1255, 7530 Greenwood, Chicago.

BECOME A game warden, professional hunter! Join forestry, park, fishery services. Good pay! Opportunities open! Free! —revealing "Select-Job Chart," details, job-getting secrets. Write Home-Study Educators, 1036-NDR LaBrea, Los Angeles 19, California.

HOW and where to obtain money. Many ways to use your time to make big money. How I started with $28 and built assets over half million dollars. Complete information postpaid $2.00. Money-back guarantee. Particulars free. Business Consultants, 5853 N.E. 2nd Avenue, Dept. "D," Miami 37, Florida.

OPERATE profitable magazine subscription service. New telephone plan. Handle renewals for all magazines. No experience or investment needed. Rush name; send No money. McGregor Agency, Dept. 510-B, Mt. Morris, Illinois.

BUY wholesale — $75,000 Merchandise catalog 25c. Worldwide, Box 12-D12, N.Y.C. 60.

NEW plastic mending tape. Just press on! Repairs clothing immediately. Lightning seller. Samples sent on trial. Kristee 115, Akron, Ohio.

EXPORT Career profitable hobby. Wade, 8/119, Hamilton Terrace, London, N.W. 8, England.

BECOME tax Consultant. Our students earn to $3,000 in 3-month season, part-time. Also operate lucrative year-round Business Tax Service. Experience unnecessary. We train you—help you start. State approved. Free literature. Union Institute, 68 Hudson, Hoboken 1E, New Jersey.

HUSBAND-wife team successful in mail order business. Details free. Edwards, Box 2427D, Dallas 21, Texas.

HOME earnings for you; compile Names; Big fees; steady income. New Manual tells how; write today. Fortier, 63 B-125 Hill, Buffalo 14, New York.

CAPITAL Easily Obtained. Any purpose. Unlimited sources. How and where, information Free. Advance, Miami 8B, Florida.

START your mail order business with the support of long-experienced Mail Order Firms. You receive marketable sample products, money-making ideas, catalogs, books, magazines, fabulous mails, etc. We list your name with 600 Mail Order Businesses. A most beneficial service for only $1.00. Satisfaction Guaranteed. Mail Compass, Dept. C, P.O. Box 94, Starkville, Miss.

REBUILD batteries; Make rubber stamps: Repair dolls. Catalog "60 Ideas" free. Universal, Box 1076-B, Peoria, Illinois.

GIANT 100 page catalog! Wholesale prices! BTS Products, Box 217, Oakland 4, New Jersey.

MINK Raising information free. Complete. Lake Superior Mink Farm, Superior E E5, Wisconsin.

YOU for President of your own collection Office. Free details. Franklin Credit, Roanoke (7), Virginia.

WHOLESALE Catalog! 30-80% Discounts! Appliances, Musical Instruments, Typewriters, Phonographs, Watches, Jewelry, Recorders, Housewares, etc. Consolidated Distributors, 21-15 Lafayette, Paterson 15, New Jersey.

THRILLING Profitable Home Business. Make fast-seller chenille monkey trees, dolls, flowers. Terrific holiday demand. Information free. Velva, Bohemia 17, N.Y.

"MAILORDER Laws and Regulations." Discusses federal, state, local licenses, taxes, legal requirements governing mailorder businesses. Play safe. Order today. Only $1.00. Tasker, 105 East Custis Avenue, Alexandria, Virginia.

ELECTROPLATE autoparts, novelties, mirrors, baby shoes. Easy, inexpensive home processes. Free booklet. Tyco Metals, Box 13231-CQ, Houston 19, Texas.

NATURAL molding rubber, extra thick. Free sample. W. Wooley, 115-B, Donald, Peoria, Illinois.

A MONTHLY repeat business which you can operate in your own community. For free details write Grasak, Dept. B-202, P. O. Box 494, McKeesport, Pennsylvania.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 178, 2954 Admiral Way, Seattle, Washington.

TO $50.00 weekly. Sparetime, home operated mailorder business. Successful "Beginner's" plan. Everything supplied. Lynn, 10420-C National, Los Angeles 34.

SAVE 20% to 50%. Buy wholesale! Nationally advertised merchandise. Free details! Beecher Sales, Box 2161-E, Cincinnati 1, Ohio.

BUY Wholesale 550,000 products. Literature Free. Carter, Box 6011-K, Chicago 80.

PLASTERCRAFT molds, liquid rubber, plasters, flocks, candle supplies. Catalog and manual free. Jayhawk Plasters, Blue Rapids, Kansas.

$500 MONTHLY for life! Your own Mail-Telephone Collection Service for Businessmen, Doctors. Easy—Profitable everywhere! Write: Financial, B-740-S12, Chicago 90.

DOLLARS: Baby record books, Kitty Kat shoes, My Baby's Album, eleven thousand new prospects daily, sold by mail, use our literature. No-Co-Ro, Oakland 6, California.

UP To $600.00 Monthly, Home Mail Order! Details Free! Stommel, Box 104, Detroit 31, Michigan.

HIGHEST commissions all magazines. Free catalog, supplies, prizes exclusive services. Subscription Service Company, Dept. D, Box 2070, Birmingham, Alabama.

SELL "Political Greeting Cards." Republicans and Democrats buy like wildfire. Wonderful mailorder item. 25c brings samples and wholesale prices. Neil H. Tasker, 105 East Custis, Alexandria, Virginia.

OIL Millionaire. How to become one. Write Texas Oil Associates, Box 486, Wichita Falls, Texas.

SAWDUST. Turn it into cash. Seventy methods. Instructions 50c. Charles Company, 12-EXF, Norwood, Ohio.

PROFITABLE Home Collection Office. Experience unnecessary. Details. Fern, 411 West Walnut, Kalamazoo 42, Michigan.

WHOLESALE Name Brands illustrated catalog 50c. Refundable first order. Distributors, Box 106, Hudson, New York.

SELL Fire Detector-Alarm systems. Zenith, Box 225, Rockville Centre, N. Y.

"STARTING a Business in Twelve Essential Steps" Save Money! Avoid Complications! Succeed! $1.00—Knowho, Box 218, Ware, Massachusetts.

Copyrighted material

COLORGLAZED Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota."

LEARN Sewing Machine Repair, "Money Secrets." Purdy's, 207-P, Weatherford, Texas.

MONEY in new greaseless doughnuts. Start in kitchen. No smoke. Sell stores. Free recipes. S. Ray Co., 3605 South 15 Ave., Minneapolis 7, Minn.

FREE! Complete Mailorder Business! Terrific Profits! No Investment! Vita-Mins. 2908PS Beverly, Los Angeles 57.

EARN $2.00 Hourly, making and selling Sandals! Youngs, 1308-PS, South First, Arcadia, California.

BUY Wholesale 550.000 products. Literature Free. Carter, Box 6011-GG, Chicago 80.

TIN-Cans. Turn them into cash. Thirty methods. Instructions 50c. Charles Company, 12-EXG, Norwood, Ohio.

RECEIVE $15.00 Thousand in advance, our way. Typewriting lists. New, excitingly profitable, interesting. Complete Particulars Free! P. Economy, Rowley, Mass.

MAKE money helping others out of debt, stop garnishments, save jobs, re-establish credit. Details. Borum S6, 411 West Walnut, Kalamazoo 42, Michigan.

BIG Profits Raising Fishworms and Crickets. Free Literature. Carter Worm Company, Plains, Georgia.

MAKE Perfumes other products sell mailorder. "Carelabs," 1914 Chouteau-PS125, St. Louis 3, Missouri.

$3.75 HOURLY Minimum, evenings. Preparing tax returns—simplified! Auditax, 34757DZ, Los Angeles 34.

$250 WEEK cleaning venetian blinds. Patented Machinery. Free literature. Robinson, 7213A, Indianapolis 1, Indiana.

LEARN modern sign painting—Commercial lettering. Anyone can be successful. Earn $40.00-$160.00 per week, spare time. Sign Instruction, Box 187B, No. Chicago, Illinois.

SUCCESSFUL sparetime mailorder business. Everything supplied. Caprock, Box 5211, Lubbock, Texas.

REVOLUTIONARY New Health product exclusive sales plan. Thousand dollar monthly common, some over two thousand. Not sold in stores. Hartman, Southold, N.Y.

PRINT for Profit at home. Amazing new method prints colorful posters, banners, greeting cards, glassware—anything. Hundreds at time. No press needed. No art. Fantastic profits! Need representative your area immediately! Free home-business plan. Screen-Print, Dept. PS-12, Los Angeles 61, California.

WANT up to $100.00 Weekly deposited in your mail box? Details free! Smith 2708-s Ladera, San Bernardino, California.

BIG money—Build a car parker. Parks five times more cars on streets or lot. Preliminary plans and information $1.00. Troop Trice, Gilbertown, Alabama.

CLIP newspaper items for steady weekly income. Learn how. Free details. Dorsetti, 2215 So. Walnut, Muncie, Indiana.

BIG money! Satisfying, creative work. Complete instructions. $1.00. Downer, 1039R Pacific, Santa Monica, California.

NEED more money? Ask for our literature. Norman Radford, Kimberlin Heights, Tennessee.

MILLIONS of prospects waiting! "Cease Fire". The Revolutionary, Push-Button extinguisher. Retails $1.49. Sample $1.00. Universal-Gerard, 2104 N. Charles, Baltimore 18, Maryland.

LIQUID marble. Beautiful permanent floors. Formula, instructions, supply sources. 50 cents. Jos. Thompson, 1021 Mohegan, Pontiac, Mich.

HAVE Home Mail Business—Get $10 Orders in Every Mail—Keep $8.00. Everything furnished. Hutchinson, Box 87-C, Dorchester 22, Mass.

EARN up to $200.00 Monthly Spare time mail order. Clyde, Box 1045, San Bernardino, California.

FREE Folio "Up to $45,000; Unlimited Vacations." No merchandise, equipment. Unknown! Work home—sparetime! Haylings-S15, Carlsbad, Calif.

$46.00 FROM Square Foot Plywood; Jigsaw necessary. Details Free. Woodarts, Bridgewater, Mass.

$16.00 PER pound, spinning Angora wool at home. Angora House, PSM, Springfield, Illinois.

NEW Low Wholesale Prices "Free Catalogue! Famous brand appliances, cameras, watches, etc." M.B.S., Box 252, So. Chicago 17, Illinois.

MAKE $100.00 Weekly addressing, mailing catalogs. Products, 2342P Washington, Chicago 12, Illinois.

OPERATE "Escolator" Mailorder System, selling our products or any products. Most revolutionary mailorder system known. Postcard: Selbyco, Decatur 175, Ill.

SPARETIME mailorder business. Profits $500.00 monthly. No investment in stock. Synacron, Box 102, 67 Poplar, Boston 14, Massachusetts.

BUY smarter—Live better—Have more—Smart Buyer's Service. Economy Unlimited. D'Erweg, Box 335G, Tarzana, Calif.

JAPAN Directory. 100 American exporters inside Japan. Send $1.00 Today. Nippon Annai, 920-3rd Ave., Box 739-P, Seattle, Washington.

FIRST Time Offered. Exclusive Distributor Franchise, Finest Quality Pens. Writeaway Pen Company, Box 7, St. Louis 14, Missouri.

$250 WEEK reported! Free book "505 Odd, Successful Businesses." Work home! Expect something Odd! Pacific-36C, Oceanside, California.

MANUFACTURERS! Complete instructions how manufacture, sell products successfully. Unique! Free booklet. Jarry, Box 268-CT, New York 5.

AFTER 11 years of business I have the Formula of success. Yours plus 6 moneymaking plans. Send preference; travel, indoors, manufacturing etc. and $1.00. McConaghy, 3806 Nile, San Diego 4, California.

OPPORTUNITY To earn $15,000 or more annually. Business of your own. Self-employed. Franchise protected and guaranteed. Live at home. No merchandise to buy. One of the most exclusive and non-competitive businesses in United States and Canada. Send for free explanatory booklet. Harrell & Company, Box 8-D, Louisville, Illinois.

"23 WAYS to build a home mail business." Free details. Penn General Distributors, Monessen 1, Pennsylvania.

WANT up to $300.00 monthly Home mail order? Details free! Prinz, Box 402-S, Pico, California.

$60.00 WEEKLY possible, addressing postcards at home for us. Outfit $1.00. Fisher-M, 1044 Fernhill, Detroit 3, Mich.

AMBITIOUS? We establish you in your own business, supply catalogues, circulars, etc., ship orders under your name, paid or C.O.D., show you exactly what to do. Household items needed in every home. Sell direct, by mail or through agents. Catalogue, plans, details absolutely free. Write Topval Corp., Lindenhurst 921, New York.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The February issue closes on December 21. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 1255, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

37A CLAIM INVESTIGATORS

INVESTIGATE Accidents—Many Earn $750 to $1000 monthly. Thousands of insurance companies, airlines, and steamship lines need Claim Investigators. We train you at home spare time. Placement counsel and help. Free book—Now! Universal Schools, Dept. B-12, Box 8202, Dallas 5, Texas.

38 MONEYMAKING OPPORTUNITIES

MAKE money addressing envelopes sparetime. Glenway, 5713 Euclid, Cleveland 3, Ohio.

WANT to go in business for yourself without capital? We show you how. Start part time your own home. Postcard brings catalogue, instructions, etc. absolutely free. Topval Corp., Lindenhurst 722, N. Y.

MAN Wanted—Are you dissatisfied with your work? Would you like a business of your own? If so, write Rawleigh's, Dept. L-GG-PSC, Freeport, Illinois.

WIN contest money. General Contest Bulletin gives hundreds of tips. Lists current contests and rules. Sample 25c. General Contests, 1609-A East 5th, Duluth, Minnesota.

START A Buying Service, buy wholesale thousands nationally advertised products. Make big profits selling at sizeable discounts. Postcard brings details. American Buyers', Hertel Station, Buffalo 16-O1, N. Y.

SELL Titania Gems; far more brilliant than diamonds. Catalog free. Diamonite, 2420-S 77th, Oakland 5, California.

SCHOOL Seniors—Sell Classmates America's most beautiful Graduation Name Cards. Largest selection. Highest commission. Outsells all others. Free sample kit. Printcraft, Dept. P, 1509 Maple Street, Scranton 5, Penna.

MAKE Spare Time Money preparing and mailing sales literature. Adams Surveys, 3513-AS Sunset Blvd., Los Angeles 26, California.

DETECTIVES—Work home—Travel. Experience unnecessary. Detective Particulars free. Write. Wagoner, P-125 West 86th, New York 24.

VENDING Machines—No Selling. Operate a route of coin machines and earn amazing profits. 32-page catalog free. Parkway Machine Corporation, Dept. 16, 715 Ensor St., Baltimore 2, Maryland.

22,000 SMART, close-mouthed ordinary American folks make really big money in a unique way, Internal Revenue Department reports. Send for eye-opening free folder. Fontel, Dept. 7, 210 Fifth Avenue, New York 10 New York.

$25 WEEKLY possible, sparetime, preparing mail for advertisers. Temple Company, Muncie 7, Indiana.

SPARETIME Profits Taking Subscriptions. All Magazines, Wholesale Catalog Free. Cassell Publishers, Westfield, N. J.

$200 WEEKLY Cleaning Venetian Blinds. Free book. Burtt, 2434B, Wichita 13, Kansas.

BUY wholesale! 30-50% Discount! Name Brand television, refrigerators, Water heaters, radios, electric housewares, power tools, etc. Catalog 25c. Marpat Distributors, Box 1485, Dept. D-PSM, Milwaukee, Wisconsin.

ENVELOPE addressing facts—extra income opportunities revealed thru HM service. Free details. Maxwell, Dept. 44-12, Cleveland 14, Ohio.

MAKE money selling to collectors. Write Solomon Goldstein, 1453 Prospect Pl., Brooklyn 13, N.Y.

"47 WAYS How to Make Money in Florida." $1.00. Lorelei Publications, 3142 Coral Way, Miami, Florida.

FOR new moneymaking mailorder opportunities write, Central Sales Outlet, Robbins, North Carolina.

MAILING postcards offering fast-selling merchandise is profitable. Everything furnished. Send 3c stamp for details. The Wm. F. Liska Co., 102 Birchwood Avenue, Cranford, New Jersey.

BECOME Finance specialist. Big profits. Complete instructions. Free details. Tucker Associates, 3633 Warder N.W., Washington 10, D. C.

WHOLESALE Catalog! 30-80% Discounts! Appliances, Musical Instruments, Typewriters, Phonographs, Watches, Jewelry, Recorders, Housewares, etc. Consolidated Distributors, 21-17 Lafayette, Paterson 15, New Jersey.

PRINTING and Office Supplies wholesale. 20.000 items. Literature free. Royal, Box 368-S, Cleveland 27, Ohio.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

LEARN Technical Metaphysics and insure your future. Easy, inexpensive correspondence course. Simplest method known. Diploma. Write: Premier College of Technical Metaphysics, 2532 McKenzie St., Vancouver 8, B.C., Canada.

METAL Castings, Art Hardware Machine. Write Box 124, Lynwood, California.

$19,000 SALES in two months. Sensational Mailorder Method actually works. Details Free. Carter's, Box 261, Gainesville, Georgia.

SELL Merchandise by mail. Everything supplied. Big profits. Details Free. Stull's Buying Service, 621 Adams Ave., Scranton, Pa.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 179, 2954 Admiral Way, Seattle, Washington.

CLOSEOUT 50,000 GE Subzero Automobile Engine Heaters. Listed $8.95, sample $3.95. Terrific quantity discounts. Illustrated literature and mailorder plans. ($1.00) (Refundable first order). Wisnieski, Milwaukee 7, Wisconsin.

BUY Wholesale! Save 66-2/3%! Appliances, Furniture, Jewelry, Toys, Sporting Goods, Tools. Free Catalogs. National Buyers Service, Box 426FB, Oakland, Calif.

FREE Details. Moneymaking offers, addressing work, earning plans. Nelson Sales, Elkhorn, 101, Nebraska.

PROFITABLE Hobby Adds To Income And Pleasure. Operate Home Mail Order Business. Write Publicity, Box 727B, Kalamazoo, Michigan.

DOLLARS In Modern Baby Record Books, Baby Shoe Kits. Liebig Industries, Beaver Dam 57, Wisconsin.

BUY it wholesale. $1.00 brings large, illustrated catalog. Hanson Volume Sales, Box 201, Ashland, Wisc.

PIANO Tuning Pays. Learn this profitable profession at home easily with patented Tonometer and mechanical aids. No knowledge music necessary. Diploma granted. Write for booklet. Niles Bryant School, 3731 Stockton Blvd., Dept. S, Sacramento 20, Calif.

WANTED: Typewriter owners. Make handsome profits. Write today, Groves Company, 682 Hastings 3, Nebraska.

HOMEWORKERS Wanted Painting Novelties. Good Earnings. N. Roland, R.R. #1, Vincentown, New Jersey.

$1,000. MONTHLY possible raising earthworms! Backyard, garage, basement. Complete illustrated booklet explains raising, feeding, packing, marketing. 25c postpaid! Ozark Worm Farm-V, Willow Springs, Mo.

START Mailorder Business! Amazing Booklet, "Build Your Own Mailorder Business," shows How! 25c—Lee D. Dahm, 383 Box Avenue, Buffalo 11, New York.

SIMPLY Mail Magazines and watch orders fill your Mailbox. 50% Commission! Send 25c for unique plan and sample. Maxted Book Agency, Western Springs, Illinois.

JEWELRY manufacturing at home without special tools or training. Professional results from the beginning. Make tremendous profits selling to your friends, stores, etc. Great variety of beautiful rhinestone, pearl and moonstone creations to select from. Small investment with all merchandise unconditionally guaranteed. You have started your own business when you send 25c for our fully illustrated catalog and other literature. A. V. Cutt Company, Inc., 210-H Fifth Avenue, New York 10, New York.

$13.50 PER Thousand. Home addressing. No selling. Details for stamp. Service, Box 37215, Los Angeles 37.

UP to $200.00 Monthly! Spare time Home Mail order! Details Free! Stauch, 948 No. Wayne, Wayne, Michigan.

SEND postcard for information on mail order business! R. Pickett, Mt. Airy, Maryland.

WANT home moneymaking ideas, plans? Write: Service, Box 636PS, Newport News, Virginia.

BIG chance to get singing experience. Gil, 2419 Thomas, Chicago 22, Illinois.

FREE Book "505 Odd Successful Businesses." Work Home! Expect something Odd! Pacific-35C, Oceanside, Calif.

ADDRESS Envelopes at Home. $50.00 weekly possible, National Industries, Box 155, Boston 26, Massachusetts. (Mattapan Sta.)

AMAZING Book! 1,000 Ways To Make Money. $2.00. Curtis, 6711 Sunset, Hollywood 28, California.

BE Successful! Napoleon Hill's "Think And Grow Rich" tells how. $2.95 Postpaid Worldwide. Mis, 3621 West Park Rd., Cleveland 11, Ohio.

EXTRA money spare time. Complete folio 25c. Refundable. Kaylin, Box 213, Manchester, Iowa.

CHURCH Groups! Sell Church Seals, Details $1.00. C. Mortenson, Hanley Falls, Minnesota.

AMAZING New and Different Crafts for spare or full time income. Free details. Sales Ideas Unlimited, 1837 Hyperion Avenue, Los Angeles 27, California.

FREE Folio "Up to $45,000; Unlimited Vacations." No merchandise, equipment. Unknown! Work home—sparetime! Haylings—S16, Carlsbad, Calif.

EXTRA money addressing mailing postcards. Gul, 2419 Thomas, Chicago 22, Illinois.

BE first—Get the latest—Best low cost starting mail order offers. Everything furnished. Order filled. Rush name. Modern Industries, 405 E. Chestnut Street, Wauseon, Ohio.

GUIDE to wealth can lead you to financial security. Amazing guide reveals success secrets of proven men. Request free folder. Aladdin Research, Box 286-S, Rte. 3., Denver 8, Colorado.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The February issue closes on December 21. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 1255. Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

39 FORMULAS, PLANS, ETC.

FORMULAS—All kinds. Latest products. Literature free. Kemico, Park Ridge 15, Ill.

100 COSMETIC formulas, latest developments, huge profits, $2.00. Brockway, 1145 High, Topeka 2, Kansas.

LARGE formula catalog free. Anything analyzed $35.00. Western Chemical, Salem, Oregon.

MODERN formulas for today's fastest selling big-profit products. Literature free! Miller, Chemist, 1517-A, Tampa, Florida.

40 PLASTICS

PLASTICS home-craft course for Men and Women. Tells and shows how to make hundreds of fast selling plastics products. All plastics and materials for 23 projects included in course. No special tools needed. Course pays for itself. Write for Free booklet. Interstate Training Service, Dept. D-2-N, Portland 13, Oregon.

NEW Liquid Casting Plastic, clear, colors. Embed real flowers, insects, photos, coins. Saw, drill, carve. Send 25c for handbook "How to Cast with Liquid Plastic" and proved success plan showing how to make money at home. Castolite, Dept. P-102, Woodstock, Illinois.

LAMINATING Supplies. Price List Free. Solomson, 46 Cornhill, Boston 8, Mass.

PLEXIGLAS—Cut to size—Clear—Any thickness — Colors — Rods — Tubing. McClarin Plastics, P. O. Box 168B, Hanover, Pa.

PLEXIGLAS, Lucite. Square foot cost. 1/16"—$1.15, 1/8"—$1.52, 3/16"—$1.86, 1/4"—$2.21, 3/8"—$3.28, 1/2"—$4.38. Colors add 10%. Send 15% for postage. Aristocrat Plastics, 23-25 Sussex Avenue, Newark, N.J.

PLEXIGLAS, Fiberglas, Polyester, Acetate. Unique wholesale-retail catalog—15c. Gem-O-Lite, Box 686S, North Hollywood, California.

41 CHEMISTRY & PHYSICS

FREE! Uranium detector and Chemical puzzle (worth $2.50) with First five lessons of Diploma course on Practical Chemistry! Big package of chemicals, filtering equipment, charts, etc. Only $1.00. National School of Chemistry, P.O. Box 606-H, Redwood City, Calif.

LABORATORY apparatus, chemicals, microscopes, complete chemistry sets, minerals, uranium ore. 10c brings catalog. Porter Chemical Co., Hagerstown 4, Md.

CHEMISTRY made easy. First lesson 25c. Formulas, information all plastics. Parkway Laboratory, R. #1, McKees Rocks, Penna.

BOOKLETS: 60 pages each! "Beginners Chemistry," "Chemistry," "Einstein's Relativity," "Physics," "Atomic Theory," "Electron Theory," "Scientific Oddities," "Light," "Sound," "Heat," "Electricity," "Radio," "Astronomy," "Useful Tables," "Geometry," "Mathematical Oddities," "Scientific Terms." (Order by Titles) 10c each. Franks, 3121 South Racine, Chicago 8.

NEW idea chemical and apparatus outfits for home experimenting. Photo-scales, microscopes, chemicals, biologicals, and laboratory supplies in small quantities. Catalog 25c. Established 1931. John H. Winn, 124B West 23rd St., New York, N.Y.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology 20c. Tracey Laboratories, Evanston, Illinois.

CHEMICALS and apparatus for industrial, analytical and private laboratories. Catalog 25c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N.Y.

CHEMICALS, Supplies, Catalog 25c. Laboratory Sales, Box 161-B, Brighton, Mass.

AMATEUR Experimenters Supplies Catalog: 20c. Hagenow Laboratories, 2414 Clarks, Manitowoc, Wisconsin.

AMAZING New Book of Science, Experiments, Formulas and catalogue of Laboratory Supplies. Only 25c. National Scientific Co., Dept. PS-12, 2204 W. North Ave., Chicago 47, Illinois.

42 HELP WANTED

OVERSEAS, Latin American, Alaska, Canada Employment. Originator 1955 "Foreign Service Directory" Up-To-Minute Report on Military & Civilian Construction; Oil Companies; Aviation; Transportation; Steamship; Mining; Government Job Info. How-When-Where to apply. Listing Firms Hiring. $1.00. Global Reports, Box 883-S, Hollywood 28, Calif.

EARN to $1500 Monthly. Many Jobs Available. Work in Fabulous South America, The Islands, Africa, USA, etc. All Trades. Labor, Clerical, Truck Drivers, Mechanics, Engineers, etc. Tax Free Earnings. Chance to Travel. Fare paid if hired. Make and Save a fortune. Application Forms. Free Information. Write Dept. 76D. National Employment Information, 1020 Broad, Newark, New Jersey.

HELP Wanted Ads, St. Louis, Missouri's Largest Sunday Newspaper Airmailed, $1.00. Specify Sex. Adcox, 2210 North 48th Street, East St. Louis, Illinois.

OPINION survey wanted. Dahl—PSL. 601 Iona, St. Paul 13, Minn.

INDUSTRY moving here! Why shouldn't you! Perfect climate! Columns of Florida jobs. Airmailed for $1.00. Box 4325, Fort Lauderdale, Florida.

JOBS. Detroit Booming. Want ads airmailed $1.00, with directory $2.00. C. Hatfield, P.O. Box 1012, East Detroit, Michigan.

$35 WEEKLY, mailing catalogs from home. Write Kenroe, Yorktown, Indiana.

CHICAGO—Help Wanted columns air mailed $1.00. Burford, 7515 Eberhart, Chicago 19, Illinois.

LOS Angeles complete classified section, Sunday edition, $1.00. Edstrom, P.O. Box 401, South Gate, California.

INDUSTRY moving south. Sunny New Orleans booming. Sunday help wanted columns airmailed. $1.00. Rogers, 728 Dumaine Street, New Orleans 16, Louisiana.

Copyrighted material

CHICAGO Help wanted ads $1.00, letters remailed 25c. Ruden, Box 3073, Merchandise Mart Sta., Chicago 54.

"ATTENTION Construction, Aviation, Oilmen!!" Trades-laborers-Truck Drivers-Clerical-Engineers-Many Others. Who to Contact for Highest Paying Jobs. To $1500.00 Monthly. Latest Copyrighted Reports, covering 52 Countries—St. Lawrence Project, Spain, Alaska, Latin America, Europe, Pacific. Year Registration-Advisory Service. Application forms. Unconditional Money-back Guarantee. Only $2.00. Airmailed $2.25. (COD's $2.49). International Reporter, Box 1047-SX, St. Louis 1, Missouri.

IMMEDIATE openings offered. Details $1.10. Pomeroy's, Three Campbell Block, Honolulu 13.

LOS Angeles—Help Wanted Columns airmailed 50c. 1924-12 Cloverfield, Santa Monica, California.

LOS Angeles job opportunities columns airmailed daily or Sunday $1.00. Full week including big Sunday listings $5.00. State male or female. J.H. Bason, 1324 W. Florence, Inglewood, California.

HELP wanted galore in Houston—South's largest city. Send $1.00 for classified. E. North, 2605 4th Street, Port Arthur, Texas.

FOREIGN jobs list. Guaranteed. $1.00. Rathe, Box 173, New Orleans 3, Louisiana.

100 FIRMS who employ overseas help. 25c. Jos. Thompson, 1021 Mohegan, Pontiac, Michigan.

NORFOLK or Richmond help wanted Columns Airmailed $1.00. Beasley, Box 8018, Richmond, Virginia.

MIAMI Jobs, Business Opportunities, Living Accommodations Airmailed $1.00. Carl Lundstrom, Box #543, Coral Gables, Florida.

HOLLYWOOD, Los Angeles, or San Diego complete classified section, help wanted, houses etc., rent or sale. $1.00 each. Air Mailed. Clark, 3761 Boundary, San Diego 4, California.

CINCINNATI help wanted or real estate columns Airmailed for 7 days. $2.00. Saylor, 30 Gallup, Wilmington, Ohio.

START mail order business in your own home. We supply catalogues, circulars etc., ship orders under your name (no stock to carry) and show you exactly what to do. Postcard brings complete details, instructions absolutely free. Topval Corp., Lindenhurst 426, New York.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The February issue closes on December 21. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 1255, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

43 AGENTS WANTED

YOUR own business—Suits $1.50; Overcoats 65c; Mackinaws 35c; Shoes 12½c; Ladies' Coats 30c; Dresses 15c. Enormous profits. Catalog Free. Nathan Portnoy Associates, 605 West 12th Place, Chicago 7.

BEAUTIFUL Feather Pictures. 200% Profit! Free sample. Apartado 9036, Mexico 1, D. F.

ABSOLUTELY Free—Sales Kit. Increase your income. Send postcard today requesting kit showing new line, belt buckles with your name or personal initials, cap badges, tie clasps, choice 3000 different emblems. Hook-Fast, Box 1425PS, Providence, R.I.

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co., 431-E North Clark, Chicago.

GOLD or Silver letters, numbers. Windows, Doors, Trucks. 1" to 6". 500% Profits—Free Samples. Atlas-U, 544 West 79th, Chicago 20.

START Your Own Business On Credit. Your own boss. 1135 of our Dealers sold $5,000 to $30,000 in 1954. We supply stocks, equipment on credit. 200 home necessities. Sales experience unnecessary. Pleasant profitable business backed by world-wide industry. Write Rawleigh's, Dept. L-U-PSC, Freeport, Illinois.

NEW Jobs open in selling! Send name, address for five free issues of Opportunity Magazine's money-making guide, listing hundreds of companies who'll pay you well, full or part-time. No experience needed. Opportunity, 850 N. Dearborn, Dept. 18, Chicago, Illinois.

BUY Wholesale thousands nationally advertised products at big discounts. Free "Wholesale Plan." American Buyers', Hertel Station, Buffalo 16-L1, N. Y.

EARN $200 a Week & Up! Amazing profits are yours selling Seal-Tite, miracle puncture-proofing discovery! $1.98 tube stops flats forever. Sure-fire appeal to America's 50,000,000 motorists! Complete sales kit Free on request. M & M, S-2, 842 Third Avenue, New York 22.

BIG Money making opportunity. Exclusive line work uniforms, Jackets, pants, shirts, coveralls. Advertising embroidered. Every business prospect. Outfit Free. Master Div., 585 Water, Ligonier, Indiana.

GOLDMINE Of 600 money-makers. Copy Free. Specialty Salesman Magazine, Desk 6, 307 N. Michigan, Chicago 1.

BE Your own boss! No investment—No inventory. Big real profitmaking wholesale catalog Free! Dept. PS, Jay Norris, 487-H Broadway, N.Y.C., N. Y.

BUY Wholesale—25,000 items—Catalog 25c. Matthews, 1472-A3 Broadway, New York City 36.

"FOG-Stop" Windshield Cloth. Instantly removes blurry Mist, Frost, Sleet, Snow. Stops windshield fogging. Samples sent on trial. Kristee 79, Akron, Ohio.

SPARE or full time top earnings selling America's largest low-priced line Business Printing and Advertising Specialties to every retail store and business. Big advance commissions. Complete order-winning sales kit Free. National Press, North Chicago 2, Illinois.

MONEY-Making Opportunity! Take big profit orders for world famous Patented Varieties Fruit Trees. Also Flowering Shrubs, Roses, Vines. Big Sales outfit Free. Stark Bro's, Desk 30166, Louisiana, Missouri.

$200 WEEKLY Cleaning Venetian Blinds. Free book. Burtt, 2434B, Wichita 13, Kansas.

CALENDARS, Advertising Novelties, Matches. All styles, including Religious. Varnished 12 sheet. Girls. Hundreds of Advertising Novelties, Book Matches, etc. Fleming Calendar Co., Promotional Division, 6539 Cottage Grove, Chicago 37, Ill.

EARN big money—Manufacture Better Mousetrap—Disposability Assures reorders—50c brings complete plans—Dispos-O-Mouser, Box 2693, Dept. PS125, Sacramento, California.

GO into business for yourself. Sell nationally popular name brand items of jewelry, watches, appliances, housewares, toys, gifts, premiums, prizes. No inventory, no investment. Send for free big new catalog now. Halen, Inc., 125 Fifth Ave., Dept. P.S., N. Y., N. Y.

$15.20 AN hour is what W. F. Wydallis reports he earns with amazing Presto Fire Extinguisher. Sells itself. No experience needed. Free Sales Kit. Merlite, 114 E. 32nd St., Dept. 50-C, New York 16.

BIGGEST distributor profits! Hire agents, salesmen! Amazing new wonder car polish with magic Dow Corning Silicones. Steady, repeat seller. Rush name for free details, no-risk sample offer. United Specialties, 1035 East 10th Street, Brooklyn 30, N. Y.

CLEANS windows without mess. Strange "dry" cleaning cloth. Replaces liquids. Windows gleam. Samples sent on trial. Kristee 78, Akron, Ohio.

BIG Profits! Stamp social security plates. Sample 50c. Catalog free. General Products, 188-PS State, Albany, N.Y.

BIG Money in Valentines! Easy to earn with 4 different Valentine Packs. Best sellers for Every occasion All Year—Mother's, Father's Day, Easter, Birthday, All-Occasion Assortments, Gifts, Stationery. Over 100% profit on Bargain Specials. Samples on approval. Midwest, 1113 Washington, Dept. 700-G, St. Louis 1, Mo.

CALIFORNIA sweet smelling beads, sensational sellers. Particulars free. Mission, 2328 P West Pico, Los Angeles 6, Calif.

WILL you wear new suits and topcoats without one penny cost and agree to show them to friends? You can make up to $30.00 in a day even in spare time, without canvassing. Progress Tailoring Co., 500 South Throop St., Dept. L-326, Chicago 7, Illinois.

WHOLESALE Catalogue! Appliances, cameras, watches! Anelag Industries, Rochester 3, Wisconsin.

BUY Wholesale! 100,000 Name Brand Products! Save 66-2/3%! Big profits selling others spare time! Free Catalogs. National Buyers Service, Box 426FE, Oakland, California.

PRINTING! Highest quality. Big profits. Free wholesale pricelist, supplies, details. Napco, 2337-PS Bath Avenue, Brooklyn 14.

EASY handwork makes fast-selling articles. Sample free. Sunmade Company, Brockton 64, Massachusetts.

BEAUTIFUL Feather Bird Christmas Folders. From Mexico. Send 25c for samples and price list. The Tradewinds Co., Box 254, Wilder, Vermont.

NEED Money? Sell Bonluth's Autospecialties. Write. Bonluth, BX1078, Bristow, Oklahoma.

BUY Wholesale 550,000 Products. Literature Free. Carter, Box 6011-SE, Chicago 80.

$1.00 PROFIT selling $2.95 photo enlargement offer. Allen Studio, Reigler Bldg., Little Rock, Arkansas.

SCHOOL Seniors. Be popular with classmates. Have spending money galore. Details free. Craftcards, Box 235-M, Pittsburgh 19, Penna.

$20.00 DAILY selling engraved nameplates. Free selling kit. Universal Engravers, Box 25, Cambridge 39, Mass.

FREE sample. Auto Compass—Magnetic. Sells $1.50. Sell thousands—Dealers—Premium Users. Smith Agency-ps, Excelsior Springs, Missouri.

BE In your own business—Buy wholesale—Big profits—Get Free nationally famous name brand mdse. catalog. Dept. PS, Normandy Distributing Corp., 133 Fifth Ave., N.Y.C., N. Y.

SPRAY—Can fire extinguisher. Sell $2.00 you make $1.50. Eleven other profitable pressurized spray can products. Amazing sellers, repeaters. Free literature. Strobel Aerosol Co., 2412-EE, Market, Louisville, Ky.

FREE book "505 Odd, Successful Businesses." Work home! Expect something Odd! Pacific-38C, Oceanside, Calif.

WHOLESALE Catalog! Housewares, appliances, watches. Postcard: Selbyco, Decatur 275, Illinois.

EARN $30 A Day! Sell Dab-It, amazing pocket-size, stick-form, "no ring" spot remover. Works like magic! Guaranteed! M & M, S-1, 842 Third Avenue, New York 22.

NEW way to make money. Sell nothing. Don't even step out of your home unless you want to. Let others do the work. Experience unnecessary. We show you how. No money for stock. We ship your orders, paid or C.O.D. Catalogue, money-making plans, etc. Absolutely free. Write Topval Corp., Lindenhurst 50, New York.

44 HIGH-GRADE SALESMEN

$15.20 AN hour is what W. F. Wydallis reports he earns with amazing Presto Fire Extinguisher. Sells itself. No experience needed. Free Sales Kit. Merlite, 114 E. 32nd St., Dept. 50-C, New York 16.

AD Matches! Sell amazing designs—10, 20, 30, 40, and 240-light book matches. Bigger spot cash commissions; every business a prospect. Low prices for high quality. Repeats. Start without experience; men, women; full, part time. Buy nothing! Sales kit furnished. Match Corp., Dept. PS-72, Chicago 32, Illinois.

ADVERTISING book matches—Cash in on big demand—sell Union label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. P-1255, 7530 Greenwood, Chicago.

Copyrighted material

45 EDUCATIONAL & INSTRUCTION

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or spare time. Details Free. No obligation. Ellis, Box 203, Cedar Grove, North Carolina.

USED Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

BE a Real Estate Broker. Study at Home. Write for Free book today. GI approved. Weaver School of Real Estate, 2018R Grand, Kansas City, Mo.

COMPLETE Your High School at home in spare time with 58-year-old school. Texts furnished. No classes. Diploma. Information booklet free. American School, Dept. X946, Drexel at 58th, Chicago 37, Illinois.

AUCTIONEERING! Be an auctioneer. Earn big money. Term soon. Free catalog. Kansas City Auction School, Box 6808 PS, Kansas City, Missouri.

STUDY For Doctor's degree of Psychology, Metaphysics and Divinity. Correspondence courses only. College of Divine Metaphysics, Dept. P-S, 2811 North Illinois, Indianapolis 8, Ind.

BECOME A Real Estate Broker or Salesman. Complete home study course. Free information. Kansas City Realty School, Box 6808PS, Kansas City, Missouri.

FREE home study course in basic economics offered as a public service. Recommended by many leaders. Send postcard for complete information. Henry George School, Dept. P. 50 E. 69th Street, New York 21, New York.

WANT A Diesel Job? New Opportunities to increase income. Higher Pay, More Money. We can help you Qualify. Tools. Shop method home training. Write today! Diesel, Tractor, Heavy Equipment Division. Interstate Training Service, Dept. B-2, Portland 13, Oregon.

EARN While You Learn Auto And Diesel Mechanics. Master this top paying trade. Many graduates earn $100 a week and up. Approved for Korean veterans. For free information write Dept. No. 262, Nashville Auto-Diesel College, Nashville 3, Tenn.

WELDING training pays at Hobart Welding School, Box P-1251, Troy, Ohio. VA contract. Best equipment. Catalog free.

QUALIFY for college equivalency degrees. Increase opportunities for promotions, better pay. No courses. Bulletin 10c. Cramwell Institute, Adams 7, Mass.

HIGH School—No Classes. Study at home. Spare Time. Diploma awarded. Write for Free Catalog HBA-50, Wayne School, 2527 Sheffield, Chicago 14, Illinois.

MEDICAL Laboratory Technicians in great demand. We train you in your own home. Catalogue free. Imperial Technical Institute, Box 973-B, Austin, Texas.

A Pleasing Dynamic Singing and Speaking Voice can be Yours! Use Canfield Self-Training Voco-Records. Thrilling Details! 2018-C-Fifth Avenue South, Minneapolis 4, Minnesota.

BIG Money in plate or pipe welding. G.I. Approved. Free Catalog. Tulsa Welding School, 919B E. Second, Tulsa, Oklahoma.

CAR Owners—Save hundreds of dollars. Unique "Know Your Car" home study course teaches trouble shooting and how to make repairs. Anyone can learn. Free Booklet. Roberts Technical and Trade Schools, 211 West 61st St., New York, N.Y.

USED correspondence courses and educational books bought, sold, rented. Free catalog. Educational Exchange, Menlo, Georgia.

PLAY Piano the first day! Copyrighted secret. Details free. Miracle Method, Box 5203-S, Phoenix, Arizona.

USED books, homestudy courses. Bought—sold. List. CH, 4167-A Hemphill, Fort Worth 15, Texas.

COLLEGE degrees—Independent study. Keep employed. Brentwood College, Box 19-721, Los Angeles 19.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 180, 2954 Admiral Way, Seattle, Washington.

PIANO Tuning pays. Big money in spare time. Learn at home in 30 days. No musical knowledge necessary. Phonograph, records, tools and instructions furnished. Free catalog. Capital Tuning School, 16 Southwest Second, Fort Lauderdale, Fla.

ANALYZE Handwriting. Earn up to $10 an hour spare time, teaching, counseling, TV, other fascinating fields. We need men, women Now to prepare for Tremendous opportunities in growing, uncrowded field. Trial lesson with All the details free. Give age. IGAS, Inc., 509 Wilhoit Building, Springfield 4, Missouri.

BOOKS, Government surplus. Bargain prices. Free catalog listing 50 other free catalogs. Instructional, educational, vocational subjects. Millions of volumes, new and used. Books bought. Est. 1902. Long's College Book Co., Dept. PS, Columbus 1, Ohio.

PIANO Tuning Pays. Learn this profitable profession at home easily with patented Tonometer and mechanical aids. No knowledge music necessary. Diploma granted. Write for booklet. Niles Bryant School, 3731 Stockton Blvd., Dept. S, Sacramento 20, Calif.

PHYSICAL Therapy and Massage—We Train You At Home. Earn Big Profits from your own Private Practice or Work with Hospitals and Doctors. Free Catalog. National Institute, Desk 3, 159 East Ontario, Chicago 11.

WOULD you be happier if there were no wars, political usurpations, revolutions, crimes, strikes, poverty, unemployment, discontent, etc.? Then investigate my proposition. David Ornsteen, Du Quoin, Illinois.

EARN Degree—orthodox home study religious courses. Free literature. Bible School, 517 Merchants Bank Bldg., Indianapolis, Ind.

LEARN Graphology Character Analysis. One Dollar, Ernst Laboratories, Mentor, Ohio.

MEDICAL Laboratory Technicians in big demand by hospitals and physicians. We train you at home. Free catalog. Century College, Desk 2, 960 Montana Street, Chicago 14.

ENGINEERING Degrees earned through Extension Division. American College of Engineering, Box 27724 (A), Hollywood 27, Calif.

GUARANTEED . . . Become Policeman or Firefighter, for Free details write Lieutenant, 1501 Kinney, Cincinnati 31, Ohio.

TUNE Pianos spare time. Learn quickly. Inexpensive home course. Write Stafford, 708A Rawlings, Carbondale, Illinois.

U.S. Civil Service Tests! Training until appointed. Men-Women, 18-55. Start high as $350.00 month. Many jobs open. Qualify Now! Get free 36-page illustrated book showing salaries, requirements, sample tests. Write: Franklin Institute, Dept. L-22, Rochester, N.Y.

BLUEPRINT Reading—train at home. Learn to read blueprints with confidence in 10 easy lessons. Write today. Belton School, 1059-C North Lawndale, Chicago 51.

TRANSFORM yourself via subconscious dynamics. Free Amazing Brochure. Box 847 (A-12), Ocean Park, Calif.

MEN wanted 21 to 65 to become Real Estate salesmen. Complete course of 12 lessons, only $10.00. Earn big money. Our 25th year in business. W. Evans, 1407 N. 12th Street, Reading, Penna.

PARLIAMENTARY Law slide rule. Simplified pocket edition. Efficient, convenient and profitable. Fifty cents. Benjamin Griffin, R. 5, La Porte, Indiana.

OFFICE Automation: Prepare for the future with the only home study course instructing 'Application of Electronic Computers to Business Clerical Operations.' Free Information. Business Electronics, Computer Division, Box 3330 Rincon Annex, San Francisco, Calif.

OFFICE Electronics—electronic brains and punched cards—fast growing field—Opportunities Unlimited—high paying positions available in all industries, education nonessential—send $2.00 for "Opportunities In Office Electronics"; Oftronics, Box 7154, Pittsburgh 13, Pennsylvania.

BECOME a Doctor of Psychology, Divinity or Philosophy in Metaphysics. Learn the secret of contentment, happiness. Write for Free Booklet. Correspondence Courses only. College of Universal Truth, 5038-K Broadway, Chicago.

46 CONTESTS

PRIZE Contests provide Fabulous and Confidential Home Income Opportunity! Here's How and Where to Win Your Share! Send stamp! National Contest Bulletin, Box 2685-PS, Miami 16, Florida.

47 DETECTIVES

DETECTIVE Training. Phillips Secret Service System, 1917-C North Kenneth, Chicago 39, Ill.

DETECTIVES. Work Home—Travel. Free particulars and badge. Exchange Secret Service System, 4554 Broadway, Chicago 40.

DETECTIVES—Work home—Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 36th, New York 24.

LEARN Civil and criminal investigation at home. Earn steady good pay. Institute Applied Science, 1920 Sunnyside, Dept. 339, Chicago 40, Ill.

48 LANGUAGE OUTFITS

IT'S fun learning a language by Linguaphone's World Standard Conversational Method. At home, quickly, easily master French, Spanish, German, Japanese, Russian, Modern Greek—34 languages available. Save time, work, Money. Send for Free book. Linguaphone Institute, 54-125 Radio City, New York 20.

49 PLAYS, STORIES, ETC.

WRITE for pay, new easy way. Turn your experiences into salable stories, articles, poems. Simplified Training Course, 1819-A Gilpin, Denver 18, Colorado.

50 BUSINESS SERVICE, INFORMATION, NAME LISTS

BRAND New Mothers . . $3.00 Thousand Names. Fresh Lists Monthly. Cavallaro, Box 2371, Cleveland 10, Ohio.

6000 OPPORTUNITY Seekers! $7.00—1,000; $.75—100. Maxwell Mailers, 2938—Oak, Bettendorf, Iowa.

5000 LATEST Buyers of $3.00 Mailorder System, on labels, $1.00 per 100. Make a test. Selbyco, Decatur 375, Illinois.

51 SPECIAL SERVICES

DOES Anyone in the United States owe you money? Send names, amount, and addresses. Dan Hughes Claim Forwarding Agency, 6327 S. Aberdeen Street, Chicago, Illinois.

52 AUTHORS SERVICE

NO luck finding a book publisher? Write for Free Booklet PS. Vantage Press, 120 West 31st, New York.

WANTED: Book manuscripts—all subjects considered. Greenwich Book Pub. (Atten. Mr. Ibsen), 489 Fifth Ave., N.Y.C.

FREE! "Tips For Beginning Writers." Career Aids, (PS), Southampton, N. Y.

53 ADVERTISING, AGENCIES, ETC., FOR ADVERTISERS

ADVERTISE: 24 words, 100 Canadian Newspapers $5.50. Lists Free. Advertising Bureau, 10511-P Springfield, Chicago 43.

PRODUCTS publicized free. Details 25c. Red Kerce, PS-642, Tallahassee, Fla.

NEWEST "Thing" Yet! Sensational $2.00 set of plans, how to shoot advertising circulars from automobile at 15 miles hour. Rocket Circular, 4933 Libbey Lane, Houston 18, Texas.

NEED "Impact" sales letters, mature advertising counsel? New service provides both. Free details. Adman's Forum, 2849-B12 Birchwood, Chicago 45.

Copyrighted material

54 CARTOONING, SIGN PAINTING, CHALK TALKS

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 1912C, Pleasant Hill, Ohio.

AMATEUR Artists, cartoonists! Turn your art ability into money. Hamilton, Box 4-PSL, Astoria 5, New York.

CARTOONIST: Amateur, Professional. Prepare for animation with Max Fleischer's plan. Write Vera Coleman, 60 East 42nd Street, New York, N. Y.

YOU can Entertain with Chalk Talks. Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin.

PAINT Signs with Master patterns. Set 1¼" to 12" high, with supplies, $2.00, sample free. Eyerly, P-583, Newton, Iowa.

56 RUBBER STAMPS & OFFICE SUPPLIES

3 LINES, $1.00. Fast Service, Catalogue, Johnson, 443 McDonough, Brooklyn 33, New York.

57 PRINTING MULTIGRAPHING, ETC.

QUALITY printing. Booklets, publications, catalogs, stationery. Free catalog. Adams Printers, 30 West Washington, Chicago 2, Illinois.

OFFSET printing, $6.50-1000. 8½x11, 16 lb. National Letters, 1457 Broadway, New York 36.

SENSIBLY Priced Business Printing. Special! 250 8½ x11" letterheads, bond, and 250 #10 heavyweight envelopes, $5.95. Postpaid, guaranteed. Free samples, quotations. Sparks Co., Box 4096, Austin 51, Texas.

$1.00, 100 ENVELOPES or letterheads, Postpaid. Poor Boy PS, Box 1055, Little Rock, Arkansas.

200 BUSINESS Cards $1.00, Postpaid. Artcraft, 95-28 Roosevelt, Jackson Heights 72, New York.

OFFSET—Saves dollars! Samples, prices, Free. Litho-Press, Madison, Tennessee.

QUALITY Printing. Posters, Signs, Banners, Pennants, Decals, Stationery. Write Wandrie, Frazee, Minnesota.

1000 EMBOSSED business cards $2.95. Decco Service, Ferguson 21, Missouri.

1,000 BUSINESS cards $2.95 up, catalog. Scull's Printing, N. Wildwood, New Jersey.

QUALITY Mimeographing, printing. Free catalog. Currier, PSM, New Lebanon Center, N. Y.

JOB Printing—Letterheads—Envelopes—Circulars. Printing, 21-S Barclay, Portsmouth, Virginia.

DISTINCTIVE Business Cards. Creative designs, quality printing. 500 $3.95. Arttype Service, Box 7099, Houston 8, Texas.

100 8½x11 LETTERHEADS $1.00 postpaid. #6¾ envelopes same. Other printing. Federal, Box 678B, Washington, D.C.

ARTISTIC printing. Letterheads, envelopes, business cards. Catalog Rushed! Steinbergen Press, GPO Box 291K, N.Y.C.

PRINTING, mimeographing, rubber stamps, introductory prices. Stark's Press, Capitola, California.

1000 EMBOSSED business cards, $2.95 Postpaid. Samples. Jaynar, Box 723A, Oak Lawn, Illinois.

FREE Catalog business personal printing. D & M Press, Sebastopol, California.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The February issue closes on December 21. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 1255, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

58 PRINTING OUTFITS, SUPPLIES

DO your own printing. Save money. Simple rules. We supply everything. Print for others; good profit. Raised printing like engraving too. Have home shop. Details free. Kelsey Presses, V-8, Meriden, Conn.

PRESSES, Supplies, Paper. Catalog 10c. Custom, Box 211-S, Springfield, Missouri.

MAKE your own self-molding rubber stamps and printing cuts. Plexirubber, Argyle 2, Wisconsin.

HOBBY Printers—Join non-profit American Amateur Press Association, 822 South Orleans, Tampa, Florida. Hobby papers exchanged.

PRINTING presses, type, supplies. Lists 3c. Turnbaugh Service, Mounted Route, Mechanicsburg, Pennsylvania.

59 PATENT ATTORNEYS

REGISTERED Patent Attorney offers services. Sanders, 6430 Evans, Chicago 37, Illinois.

INVENTION Record form free and "Patent Information Every Inventor Should Have". Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

INVENTORS—Send today for instructive booklet "Patent Protection for Inventors" giving detailed patent information and outlining preliminary steps to take toward patent protection,—also "Evidence of Invention" form. Victor J. Evans & Co., 141-P Merlin Building, Washington 6, D.C.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John Randolph, Registered Patent Attorney, 207 Columbian Bldg., Washington 1, D. C.

C. A. Snow & Co.—S-427, Snow Building, Washington 1, D. C. Registered Patent Attorneys. Write for information.

INVENTORS: Learn how to protect your invention. Unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and prepared to serve you in handling your patent matters. "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded to you upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 52B-K District National Building, Washington, D. C.

INVENTORS—If you believe you have an invention you should find out how to protect it. The firm of McMorrow, Berman & Davidson with offices in Washington, D. C., is qualified to take the necessary steps for you. Send for copy of our Patent Booklet "How to Protect Your Invention." We will also send you an "Invention Record" form. No obligation. They are yours for the asking. McMorrow, Berman & Davidson, Registered Patent Attorneys, 143-G Victor Building, Washington 1, D. C.

PATENTS—Irving L. McCathran, 316 McLachlen Bldg., Washington 1, D. C. Registered Patent Attorney.

"INVENTOR'S Guide" and "Record of Invention" free on request. Frank B. Ledermann, 154 Nassau Street, New York City.

INVENTORS: When you are satisfied that you have invented something of value write me, without obligation, for information as to what steps you should take to secure a Patent. Write Patrick D. Beavers, Registered Patent Atty., 938 Columbian Bldg., Washington 1, D. C.

60 FOR INVENTORS

INVENTORS, if you have an invention for sale, patented or unpatented, write Institute of American Inventors, Dept. 30A, 631-E St., N.W., Washington 4, D. C.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John Randolph, Registered Patent Attorney, 206 Columbian Bldg., Washington 1, D. C.

INVENTION Record form free and "Patent Information Every Inventor Should Have." Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

INVENTORS—Send for free patent information book and inventor's record. Registered Patent Attorney, Associate Examiner, Patent Office 1922-1929; Patent Attorney & Advisor, Navy Department 1930-1947. Gustave Miller, 125PSI Warner Building, Washington 4, D. C.

INVENTORS—This firm is registered to practice before the United States Patent Office and available to assist you in the preparation and prosecution of your patent application. "Patent Protection for Inventors" booklet containing detailed information and steps to take toward patent protection sent promptly upon request. No obligation. Victor J. Evans & Co., 142-P Merlin Building, Washington 6, D.C.

INVENTIONS Promoted. Patented or unpatented. A-1 service for inventors since 1911. Write Adam Fisher Co., 5418 Idaho, St. Louis, Mo.

INVENTORS: Learn how to protect your invention. Unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and prepared to serve you in handling your patent matters. "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded to you upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 52A-K District National Building, Washington, D. C.

INVENTORS—If you believe you have an invention you should find out how to protect it. The firm of McMorrow, Berman & Davidson with offices in Washington, D. C., is qualified to take the necessary steps for you. Send for copy of our Patent Booklet "How to Protect Your Invention." We will also send you an "Invention Record" form. No obligation. They are yours for the asking. McMorrow, Berman & Davidson, Registered Patent Attorneys, 143-F Victor Building, Washington 1, D. C.

FREE Patent Booklet and Record of Invention on request. H. Lawrence Blasius, 15 Park Row, New York City.

DEVELOP, sell inventions, inventive ideas. Impartial, practical, simplified plan. Free Outline. Adman, 255-C Glenwood, Syracuse 7, New York.

"INVENTOR'S Guide" and "Record of Invention" free on request. Frank B. Ledermann, 154 Nassau Street, New York 38, New York.

SEARCHES—Put your patent searches in the hands of a Registered Patent Attorney or Agent as he qualifies to give a worthwhile patentability report. Record of invention form upon request and information on patent protection. Patrick D. Beavers, Registered Patent Attorney, 939 Columbian Bldg., Washington 1, D. C.

SAVE Money on your patent application. Patents for any country. Details free. International, 25 McMaster, Toronto, Canada.

INVENTORS: Protect your invention yourself. Get free help from U.S. Patent Office. Sell it yourself. Free information. Dynavolt Company, 3310 Huntington, Newport News, Virginia.

PATENT Searches $5.00. 48-hour service. Free Invention Protection forms. Write Raymond L. Smith, Patent Searcher, 622 Sheraton Building, Washington 5, D. C.

PATENT Searches, including copies of nearest patents, $5.00. Reports airmailed within 48 hours. More than 100 registered patent attorneys use my service. For Free invention protection forms, write Miss Ann Hastings, P.O. Box 176, Washington 4, D. C.

PATENT Searches $5.00. 48-hour airmail service. Invention Protection forms free. Write Patent Engineering Service, 711 14th Street, N.W., Washington 5, D.C.

PATENT pending. No attorney required. Send six cents in stamps for all information. Paladin Publications, 2093 Atlantic Avenue, Bellmore, New York.

61 INVENTIONS WANTED

INVENTIONS wanted. Patented; unpatented. Tremendous Manufacturers lists. Global Marketing Service, 2420 77th, Oakland 5, Calif.

PATENTS sold—commission basis. National Patent Sales, 1312 East 44th, Richmond 24, Va.

Copyrighted material

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information free. Institute of American Inventors, Dept. 30C, 631—E Street, N.W., Washington 4, D. C.

INVENTIONS promoted. Patented; unpatented. Outstanding manufacturer lists. Unequalled service; particulars upon request. Superior, 338-342 North Rodeo, Beverly Hills, California.

INVENTORS Don't sell your invention Patented or Unpatented until you receive our offer, write Cowgill, Box 298, Marion, O.

INVENTIONS Wanted. Patented or Patent Pending. 24 years experience Promoting Inventions. National Service Bureau, 3122 Meramec, St. Louis 18, Mo.

CASH Buyers for ideas and inventions. Write National Inventors Institute, 457 Munsey Building, Washington 4, D.C., or 4900 Euclid Avenue, Cleveland 3, Ohio.

INVENTIONS wanted now by my Manufacturer-Clients. Patented, Unpatented. Send for Free Form "R". Adams, Patent Broker, 80 Wall Street, Financial District, New York City.

63 MANUFACTURING

MANUFACTURERS! Executives! Complete manufacturing, selling instructions. Free Booklet. Jarry, Consultant, Box 268-CA, New York 5.

64 MODELS, MODEL SUPPLIES

SHIP and yacht model fittings; blueprints. Send 35c for illustrated catalog #29 listing hundreds of items. A. J. Fisher, 1002-2 Etowah Ave., Royal Oak, Michigan.

SHIP and other scale models. Most complete line in New England. Kits, fittings, plans, books, tools, engines, motors. Illustrated catalog 25c. James Bliss & Co., Inc., Dept. PS, 342 Atlantic Ave., Boston 10, Mass.

1955 CAR Models, 1/25 scale, all metal chrome trim. Send for catalog! Cars & Hobbies, Dept. PS-15, 2333 Haddon, Chicago.

ELECTRIC trains. All makes repaired. Fast mail service, satisfaction guaranteed. Catalog free. 20-50% discount Trains, accessories, Appliances, bicycles. Mack Bros., 2039 Chicago, Chicago 22.

SHIP Models and yacht supplies. Complete, Large 68 page catalogue 50c. William Wild, 510 East 11 St., New York City 9.

GEARS and model supplies for the inventor. Send 10c for catalog. Pierce Model Works, Tinley Park, Ill.

POWER Models. Unusual steam, gasoline and traction engines, fittings, metals. Anniversary catalog 50c. Charles Cole, Ventura, California.

SHIP Model kits and numerous fittings from authentic plans including clippers, trawler, fishermen, frigates, privateer, radio control tug, etc. Send 25c for our new 1956 catalog. Model Shipways, Folio P, 39 West Fort Lee Road, Bogota, N. J.

MODEL Steam Plant (English) ready for assembly; Engine $16.00, Boiler $18.00, accessories. Literature: Floyd McGuckin, 314 Monroe, Ridgewood, New Jersey.

STEAM engines, boilers, castings. Catalog 25c. Anton Bohaboy, 2297 Price, Rahway, N. J.

MODEL Railroads, HO and O, over 850 cast metal items illustrated, catalog only 10c. Selley, 744 Clay, Winter Park 8, Florida.

LIVE Steam Locomotives. Build Them Yourself. Supplies and Machinery Catalog 25c. Yankee Shop, Box 275a, Danvers, Mass.

"ST" Steam engine castings, fittings, boat plans catalog 15c. Ship Models Ltd., 186 Summer, Andover, Mass.

65 HOME CRAFTSMAN

ALL Crafts, Supplies. Large Free Catalog. National Handicraft, 199 William St., New York 38.

PLASTICS home-craft course for Men and Women. Tells and shows how to make hundreds of fast selling plastics products. All plastics and material for 23 projects included in course. No special tools needed. Course pays for itself. Write for Free booklet. Interstate Training Service, Dept. D-2-N, Portland 13, Oregon.

LEATHERCRAFT. Send 10c for new 60-page catalog of tools, supplies, kits. Including metalcrafts, enameling, ceramics, all other crafts. Complete stock. Reasonable. Since 1910. Sax Bros., Dept. PS-12, 1111 N. 3rd. Milwaukee, Wisc.

BUY wholesale nationally advertised power, hand tools, thousands other products at big discounts. Free "Wholesale Plan." American Buyers', Hertel Station, Buffalo 16-R1, New York.

MAGIC "Velcoat" sprays fur or velvet finish on any article. Multiplies value. Refinishes shoes, bags, toys, pictures, like new. 6-Color kit $4.95. Single color $1.00. Literature free. Velcoat, Box 5172-PD, Tulsa 16, Okla.

FREE "Do-It-Yourself" Leathercraft Catalog. Tandy Leather Company, Box 791-011, Fort Worth, Texas.

LEATHERCRAFT, metal enameling, beadcraft, shellcraft, metal tooling, textile painting, many other crafts. Free big illustrated catalog. Kit Kraft, Dept. 3212, Studio City 1, California.

FREE! Large Complete Leathercraft Catalog. J.C. Larson Co., 820 S. Tripp, Dept. 5752, Chicago 24.

WOODWORKING for home craftsmen. Twenty-two manuals. Over 1,000 pages, 75 training projects. Only complete home training program available. Carefully written, profusely illustrated. Covers everything in cabinet making from wood selection to final finishing. Complete instruction in care and use of all hand and power tools. Prepared by manual training instructors. Write for free booklet. Interstate Training Service, Dept. G-2-N, Portland 13, Oregon.

NEW! Largest Leather and Craft Catalog! 1000's of items. Send 25c (refunded with first order). Russo Handicraft Supplies, Dept. P10, 245 S. Spring, Los Angeles 12, California.

101 FULL size patterns. Smart new gifts, novelties, lawn figures, shelves, windmills, alphabets. Plus "Make Money Jig Sawing" and illustrated catalog of patterns. Only $1.00. Mastercraft, 125S, 7041 Olcott, Chicago 31, Ill.

MAKE your jointer a thickness planer with workshop scraps, plans $1. J. Skeeters, Box 1227, Jacksonville, Texas.

WIRECRAFT—ideal gift for hobbyists. Do it yourself—smart wrought iron wall decorations from coat hangers and tin cans. Use solder or liquid solder. No fancy bending tools required. Six different plans, instructions—$1.00. Wirecraft, Box 408s, North Miami Beach, Florida.

JIGSAW, bandsaw owners, extra profits, fun. Free details, Dept. B, Nu-Art, Box 2235, Boston.

SQUAREKNOTTERS: Make belts, handbags, lanyards, dog leashes, etc. Special offer! Beginner's book, catalog and quality cord samples 15c. P. C. Herwig Co., Dept. 71-P7, 39 Henry St., Brooklyn 1, New York.

LAMP size Cypress Knee, with nipple installed $2.00. Cy Products, Dept. 3-N, Lafayette, Louisiana.

STYLECRAFT sure fire hits. "Pretraced" leather kits. Handbags, Billfolds, Filigree Belts, over fifty other projects. Patterns on leather. Why trace? Just carve, assemble and lace. Large assortment "Precarved" kits also available. Send 25c for catalog, free folder. Refunded first order. Apache Leather Company, 2804 E. Washington St., Phoenix, Arizona.

KNOCKDOWN cedar chest and lumber free price list. Bedford Lumber Company, Shelbyville, Tennessee.

VIOLINMAKERS. Amateurs, Professionals. Fine tone European Wood. Complete materials, tools, instructions, patterns. Illustrated Catalogue 10c. Premier Violin Supplies, Division SVP, 430 South Broadway, Los Angeles 13, California.

LEATHERCRAFT Tools, Leather Embossing Plates, Craft Accessories, Dies. Catalogue 10c. Louis Jones Engineering Company, 1613 Main, Fort Worth, Texas.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The February issue closes on December 21. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 1255, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

66 BUILD IT YOURSELF

MELT cast iron, brass and aluminum. Make castings for yourself and for profit. Send for literature. Ursutz Burner Co., Box 2293, Globe, Arizona.

MAKE fluorescent fixtures: Complete instructions and catalog of inexpensive kits and parts 35c. Shoplite, Box 63S, Nutley 10, New Jersey.

BUILD—Beautiful inexpensive 5' Grandmothers clock. Plans 50c; details free. Granny Clocks, Box 421, Hempstead, N.Y.

CABIN, cottage, hunting lodge, ranch house! Have any one with aid of amazing new book "How To Build Cabins & Ranch Houses"! 256 pages, 207 pictures. 17 different plans—any one worth more than 3 times the low cost of entire book! If not delighted return book for full refund. Send only $2.49 to Popular Science, Dept. 1255C, 353 Fourth Avenue, New York 10, N.Y.

PLANS! Build any size garden tractor. Write Allardco, Eland, Wisconsin.

GEIGER Counter and Metal Detector Kits. Inexpensive. Educational. Free Literature. Electronic Applications, 5024 Lee Hwy., Arlington 7, Va.

FURNITURE . . . Build it with our wrought iron legs—wood legs, or metal frames! Free catalog. Phillips Furniture, East Peoria 6, Illinois.

BUILD your own decorative electric clock with our heavy-duty movement, plans and idea sheets. $9.95 postpaid. California Clock Craft, Box 8, Altadena, California.

PLANS for Piddlers, $1.00 each. 1. Emergency light plant, 300 watts, 110 volts, AC. Made from rebuilt car generator and lawn mower engine. 2. Drill water well by hand. Rotary method. Use same pump and pipe for both drilling and producing. Very cheap and fast. 3. Push-button controls on your overhead garage door, using simple hand tools and parts usually found around the home workshop. Bennett, 2461 Lucas Drive, Beaumont, Texas.

COMBINATION contour and decorator chair. Change in seconds. No sewing. Instructions $1.00. Circular free. Hart Company, Payne, Ohio.

INSULATION. Save 75% U-Do-It. Complete Plans $1.00. Refundable. Jordan's, Tell City, Indiana.

GRANDFATHER clock shoptested plan, dollar—thousands built. Kuempel Klox, Minneapolis 16.

MAKE Your Own Furniture! New 256-page book "How to Build and Repair Your Own Furniture" shows you how to save big money making and repairing tables, chairs, bookcases, desks, cabinets, shelves, much more! Step-by-step directions, hundreds of illustrations. Only $2.49—money-back guarantee. Popular Science, Dept. 1255C, 353 Fourth Avenue, New York 10, N.Y.

67 OLD GOLD, JEWELRY, WATCHES, ETC.

COSTUME Jewelry supplies. Catalog and Samples. 35c. Largest line in America. Milady-Fair Co., G.P.O. Box 1328, New York City 1.

RHINESTONES. Jewelry settings, copper enameling, hobby kits. Illustrated catalog 10c. J & M Novelties, Dept. CP-4, Griffith, Indiana.

FREE Sample pair of earrings with catalog 25c. Exclusive line of make your own costume jewelry. Barry's, 214 Ardsley Ct., Newark 2, N.J.

UNUSUAL gold plated hand painted key chain design for all 48 states $1.00. Picks Products, 1220 Adams, Little Rock, Arkansas.

WHOLESALE. Watches, jewelry, free price list. Walter Lehmann, Buchanan, New York.

USED and new watches. $2 up. Free List. Southern Watches, Gray, Georgia.

Copyrighted material

WHOLESALE Watch catalog. Write Clear-Vue, 1237 Knott Building, Dayton, Ohio.

10 SWISS watches $18.00, catalog 10c. Berkowitz, 1150 Castlehill, New York 62.

68 TOBACCO & PIPES

PIPE Smokers! Cigar Smokers! Free illustrated catalog offers fabulous savings on choice imported and domestic pipes, cigars, tobaccos, supplies. Write Wally Frank, Dept. 26, 150 Nassau Street, New York 38, N. Y.

CUSTOM pipes, pipe making. Supplies. Tools. Instructions. Walter Miller, Germantown, Ohio.

PIPE Smokers—Fine aromatic, imported, domestic tobaccos, reasonably priced. Pete Moberly, Box 801, Owensboro, Kentucky.

69 FOR THE HOME

FOAM rubber furniture cushions—Factory seconds 50% discount. Free catalog. Perma-Foam, 429a Central Ave., East Orange, New Jersey.

BUILT-in electric wall clock kit. $18.00 postpaid. Guaranteed. Arkay, 356 Hoe Avenue, Scotch Plains, New Jersey.

HEAT your home or business for almost nothing. Thousands satisfied. Valuable free information. Henault, R.F.D. #1, White River Junction, Vermont.

HOME Appliance Fix-It Manual. 280 pages crammed with pictures, diagrams and directions for repairing toaster, refrigerator, heating systems, vacuum cleaner, motors, iron, fans, washer, broiler, more! Thirty chapters, fully indexed. Hard-paper edition of $4.95 book! Send only 99c to Popular Science, Dept. 1255C, 353 4th Ave., N. Y. 10, N. Y.

LANDSCAPE your property, build trellises, arbors, gates, fences, garden screens, outdoor fireplace-barbecue, flagstone walks, beautiful garden furniture, a garden pool, much more! Amazing new "House & Grounds" book even shows how to add a breezeway-carport, terrace, porch or patio! 256 information-packed pages, over 700 pictures. Send only $2.49 to Popular Science, Dept. 1255C, 353 Fourth Avenue, New York 10.

70 OF INTEREST TO WOMEN

MAKE money addressing envelopes sparetime. Glenway, 5713 Euclid, Cleveland 3, Ohio.

WANT To Make Big Money At Home? $5 profit in an hour possible with Invisible Reweaving. Make tears, holes disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details Free. Fabricon, 8336-S Prairie, Chicago 19, Illinois.

EARN sparetime money doing mailing work at home. Kentco, Patterson Block, Muncie 7, Indiana.

ENVELOPE addressing facts—extra income opportunities revealed thru HM service. Free details. Maxwell, Dept. 83-12, Cleveland 14, Ohio.

$50 WEEKLY sewing ready cut products. Eschin, Box 4227, San Francisco, California..

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 181, 2954 Admiral Way, Seattle, Washington.

UNUSUAL opportunity to buy nationally advertised products wholesale! Large illustrated catalog. Write, Ila Rose, Bascom 6, Ohio.

12 PAIRS Ladies' Nylons $2.50. Picard, 626½-P, Bagot, Quebec 8, Canada.

64 PAGE Booklets! "Pin Money," "Candy Making," "Short Story Writing," "Charming Hostess," "Making Cosmetics," 10c Each. (Specify Title). Franks, 3121 South Racine, Chicago 8.

BEAUTIFUL stainless steel flatware direct from factory, save half. Factory Representative, 5125 Annette, Baton Rouge 5, Louisiana.

71 FOR SALE MISCELLANEOUS

NEW tool center finder, $1.00 postpaid. Harry Fiske, 84 Ararat St., Worcester 6, Mass.

72 WANTED TO BUY

QUICKSILVER, Sterling, Silver Solders, precious metals. Mercury Terminal, Norwood, Massachusetts.

SCRAP Mercury (Quicksilver) containers supplied. Tantalum—Bismuth—Tungsten. Metallurgical Products Co.—Established 1909, 35th & Moore Streets, Philadelphia 45, Pa.

74 RAZOR BLADES, SHAVERS

BLADES—100 for $1.00. Microsharpened. Guaranteed smooth shaves. Double-edge. Practical gift. Bardin, Box 821, Chicago 90, Ill.

IMPORTED German razor blades, finest in the world. 50—$2.00. Mason's, 780 Broadway, Newark, New Jersey.

125 "DON Juan" double edge blades $1.00, Thousand $6.00. Guaranteed. Johnson's, 605 Wells, St. Paul 1, Minn.

75 TATTOOING SUPPLIES

TATTOOING Outfits, licensed course. Brochures 25c. Zeis, 728 Leslie, Rockford, Illinois.

76 DRAWING, SUPPLIES & EQUIPMENT

FINEST German drawing instruments and slide rules. Factory prices. Catalog. Crawford's, Box 147-P, Joanna, South Carolina.

ARTISTS Brushes. Wholesale to schools, stationers. Send sample for estimate. H. Apoian, 36 Porter Avenue, Brooklyn, N.Y.

77 GEIGER COUNTERS & TREASURE FINDERS

GOLD, Silver, Metal Detectors, Geiger Counters for Uranium, Mineralights. Sensational new fully guaranteed models. None Finer Information Free. Detectron Corp., 5528 Vineland Ave., North Hollywood, California.

SELECTIVE metal and mineral detector. Revolutionary design. Distinguishes metals from black magnetic sands. Readily detects metals under salt water. Also Geiger Counters. Free literature. Gardiner Electronics Company, 2545 E. Indian School Rd., Phoenix, Arizona.

AMAZING triple-action Geiger Counter U-238C, combines audio, neon flasher, meter. Guaranteed best available. Also metal detectors and Scintillation counters from $49.50. For radioactive uranium sample send 25c to Goldak Company, 1540 W. Glenoaks Blvd., Glendale, California.

FIND Gold, Silver, other valuable minerals with a CMC Metal Detector. Also uranium detectors. New Models, fully guaranteed. Catalogs Free. CMC Corporation, 5457 Cleon Ave., North Hollywood, Calif.

URANIUM, Gold, silver treasure. New, power-packed, highly sensitive Metal Detectors, Geiger Counters and Mineralights, Kit and Assembled Models from $12.50. Lightest weight, guaranteed, free literature. Electronic Applications, 5024 Lee Highway, Arlington 7, Va.

GEIGER Counter — With Geiger-Guard voltage regulator! $22.50. Carson, 316 Lee, Iowa City, Iowa.

LEARN Mineralogy at home. Diploma course. Fortunes now being made in Uranium and other minerals. Free catalog. Mineral Science Institute, Desk 3, 159 East Ontario, Chicago 11.

"HOT Rock" Geiger Counter Kit. Only $15.95 Complete. Send $5.00, balance C.O.D. Catalog. American Laboratories, 471 Clifton Avenue, Newark 4, New Jersey.

TREASURE — Metal — Mineral locators M-Scope type. Latest electronic design $75.00 up. Geiger counters—Scintillators—Mineralights for uranium prospecting $35.00 up. Fully guaranteed. Monthly payment plan available. Books "How to Be a Successful Uranium Prospector" — "For Fun and Profit"—Literature free upon request. Fisher Research Laboratory, Inc., Palo Alto, Calif.

GEOLOGY, Lapidary Books. Free list. Gazette Publisher, Airport Station, Los Angeles 45.

QUICK, Accurate analysis, "Uranium." Analytical Testing and Research Labs., 79 Union Place, Hempstead, New York.

NEW. Uranium detector kit, $8.49. Free catalog. CMG, Box 611-PS, Laramie, Wyo.

BOOK, "Prospecting for Uranium," plus list, "Where to Obtain Equipment for Prospecting." $1.00 postpaid. Bills, 327 Riverside, Chillicothe, Ohio.

78 WATCH REPAIRING

WATCHMAKERS'—Jewelers' Supplies, Instructions. Catalog 20c. Bengal Company, Culver City, California.

WATCH and clock repairing books. Free information. North American, Dept. 25-M, 2320 N. Milwaukee, Chicago 47, Illinois.

WATCHMAKERS' Tools, Materials, Supplies, Watches, Catalog. Gales, Box 1000, Chicago 90, Illinois.

USED and new watches. $2 up. Free List. Southern Watches, Gray, Georgia.

WATCHMAKERS' Journal contains instructive articles on watch repairing. $1. year. Sample copy 20c. Dean Company, Box 3218-A, Daytona Beach, Fla.

79 MISCELLANEOUS

BUY Wholesale thousands nationally advertised products at big discount. Free "Wholesale Plan." American Buyers', Hertel Station, Buffalo 16-V1, New York.

FORESTRY, game warden, park, fish hatchery, patrol and wildlife conservation jobs pay well. Prepare now. Write Delmar Institute N6, Whittier, Calif.

SURPRISE your wife, family, friends and yourself with gifts from Japan on Christmas, birthdays, happy occasions. Lots of fun. Pearl necklace $7.00, ring $3.00, colored porcelain necklace $4.00, ear-ring $2.00, toys $1.00 each, other novelties as requested, postage included. We, also, solicit exchange of goods between Americans and Japanese. Fee—$1.00. Send Government or American Express Money Orders. Clarence Yamagata, Room 202, Naka 7 Building, Marunouchi, Tokyo, Japan. Will confirm each order.

HAND-Made 12k. Gold name-pins, ocean pearl mounted, $1.25 ppd. Barney, 12 Division, Koch, Missouri.

POLISHING pads, guaranteed, trial pack $1.85. Located, Box 602, Shelley, Idaho.

300 INTERESTING mails, 63 magazines: $1.00. Postals, 1514 West Eleventh, Brooklyn 4, New York.

AFRICAN Glassclay, blackwood, ivory, exquisite souvenirs, details: Severino, Box 709, Beira, Mozambique.

LETTERS remailed, 25c. Secret address, receiving, forwarding. International Service, 7620 South Figueroa, Los Angeles 3, California.

INDIAN Lucky Charm $3.00, brings luck, success, fulfills desires. S. B. Wazkar, 51, Khattargully, Bombay 4.

BIG interesting mails three months 25c, year $1.00. Harvey Teeple, Decatur, Ind.

WHOLESALE Catalog! 30-80% Discounts! Appliances, Musical Instruments, Typewriters, Phonographs, Watches, Jewelry, Recorders, Housewares, etc. Consolidated Distributors, 21-18 Lafayette, Paterson 15, New Jersey.

THOUSANDS Nationally Advertised Brand Name products—discounts to 80%. Meder, 550-PS Fifth Avenue, New York 36.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 182, 2954 Admiral Way, Seattle, Washington.

CATALOG of the most efficient cesspool and drain cleaning equipment. Mail 50c to learn how to fix that faulty cesspool, clogged waste pipe or drain. Free advice on how to do-it-yourself. Send details of your particular problem. Electric Sewer Cleaning Company, Boston 34, Massachusetts.

RECEIVE Magazines, samples, catalogues. Mails from everywhere. Offers, hundreds. Get listed 25c. Rorick, Box 86-M, Cincinnati 26, Ohio.

300 BIG Mails guaranteed. Samples, offers, plans, propositions, 12 months listings, $1.00 (refundable). Wright Publications, 2276 Hubbard, Memphis 8, Tenn.

BUY Wholesale! Appliances-Homewares-Furniture - Jewelry - Watches - Everything! Free Catalogs. Free Details. Econ-O-Mart, 8 Perry, Whippany 6, New Jersey.

BUY Wholesale 550,000 Products Literature Free. Carter, Box 6011-PS, Chicago 80.

FREE Gifts, commissions, no selling. Giftking, Box 2532, Ft. Huachuca, Arizona.

PICTURE Post Cards Made From Your Photograph, 1000 $11.00. Raum's, 4154 Fifth Street, Philadelphia 40.

Copyrighted material

A Different kind of interesting mails 25c. Lidian Press, 446 Crown Street, Brooklyn 25, New York.

UNUSUAL Surprise Gift Package. 2 useful gadgets, hits from exhibitions, shipped direct from Germany, with special issue stamps, postage duty free; send $1.00 to Uhlich Co. 10568-105th Street, Edmonton, Alberta, Canada. Ask for New import catalog.

B.C.M. Dupre, 3, Bloomsbury St., London, W.C.1. England, offers Connoisseur's Collection art studies $1.00.

SURPRISE your friends. Mexico air remails. 50c. Use my forwarding address. Answers sent free. Felipe Saldana, Aprt. 12, Tlaxcala, Mexico.

GIFTS for her. Woodpecker salt and pepper set. Hand Painted. Cute collector's item. $1.00 postpaid. No C.O.D. Kingcraft Company, 2608 S.E. 59th Ave., Portland 6, Oregon.

LEARN home mailorder. Buy wholesale, 925,000 items. Literature-stamp. Carnahan Brothers, 9610-A Acacia, Fontana, Calif.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The February issue closes on December 21. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 1255, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

80 PERSONAL

PSORIASIS Victims: Hopeless? New Discovery! Free Trial Offer. Write Pixacol, Box 3583-S, Cleveland, Ohio.

"HOW Can I Find Out?" You Can! Information confidentially developed. Any matter, person, problem. World-wide. Officially licensed. Established 1922. William Herman, 170 Broadway, New York.

PROFIT! Prestige! Publish a magazine under your own name! Only $3.25 per month! Sample, details 5c! Filmer, 910 Marion, Pharr 17, Texas.

LATEST Methods treating piles, fistula, colon-stomach disorders. Write for free book. McCleary Clinic and Hospital, E-144, Excelsior Springs, Mo.

DETECTIVE'S Opportunities. Detective particulars free. Write. Wagoner, P-125 West 86th, New York 24.

BORROW By Mail From Postal Finance Co. Employed Men and Women can easily obtain $50 to $600 Fast, Entirely By Mail. Repay in small monthly payments. Friends, relatives, employer, tradespeople will not know you are applying for loan. Advise occupation, amount wanted. Postal Finance Company, 200 Keeline Bldg., Dept. 13Z, Omaha, Nebraska.

"INTERESTING Mails"—25c keeps your mail box full three months. Bentz, Desk-M/47, Chatawa, Mississippi.

OPINION survey wanted. Dahl—PSP, 601 Iona, St. Paul 13, Minn.

REMAILING—25c. Local Address $2.50 month. Royal Service, Box 3201, Denver 18, Colo.

MARRIAGE and divorce requirements all 48 states. Send $1.00. Pacific Enterprises, 5413 York, Los Angeles, Calif.

REMAILING — Letters 25c. Hawaiian Post cards 20c. StelGene, 819 Murray Dr., Honolulu 18, T.H.

FINANCIAL independence in ten years. Safe, sure. Informative booklet $1.00. Manlico, Box 115, Manlius, New York.

MEXICAN Legal Matters. A. Espejo, Box 217, Tijuana, Mexico.

MEXICAN remails 25c. Gigantic Mexican opportunity mails $1.00. Robert Hintz, Ajijic, Jalisco, Mexico.

WHAT Is Your "I.Q."? Take reliable intelligence test. Approved, scientific. Confidential report by mail. Free information. University Test Bureau, Desk A-4, Box 401, Palo Alto, California.

HANDWRITING Analysis Character reading—60c and up. Expertly prepared, fully guaranteed. N. Hildebrandt, 4906-D "N" Street, Southeast, Washington 27, D.C.

LETTERS Remailed from Brooklyn 25c each. Confidential, write—"Flash", Box 36—HS, Brooklyn 4, N.Y.

REMAILS from Detroit 25c. Sunday classifieds $1.00. Fyffe, 4427 Thorncroft, Royal Oak, Michigan.

LOS Angeles, San Francisco, San Diego, Classified $1.00, each. Reairmails $1.00, Rare California Souvenir $1.00. "Lesco", Box 2054DS, Riverside, California.

REMAILS from Hollywood or Los Angeles 25c. Sutherland, 1362½ N. Ridgewood Pla., Hollywood, California.

COMPLETE remailing service. North Pole or Fairbanks, Alaska, Letters 50c, Monthly $3.00. Information free. 520 7th, Fairbanks.

ARE you tired, rundown, overworked, nervous, irritable. Then write The May Company, Dept. AB2, P.O. Box 625, Lynchburg, Virginia.

SATISFY desires. Discover unexpected power! "Chart-Yourself"—$1.00. Consultations free. Dorservice, Ojai, California.

STUPENDOUS power over others. (Write). Delmar Wisdom, 846 Sunnyside, Chicago 40.

PIMPLES, blackheads. Get rid of them easy, quick. Write The May Co., Dept. AB3, P.O. Box 625, Lynchburg, Virginia.

FABULOUS Los Angeles County where billion-dollar construction boom continues. Jobs, opportunities galore. Buy new homes, cars, no down payment. Big Sunday classifieds $1.00. Letters remailed from Los Angeles 25c each. Monroe, Box 365-B, Bellflower, California.

MEXICAN Law, General Practice Attorney, Apartado 79, Juarez, Chih, Mexico.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The February issue closes on December 21. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 1255, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

INCREASE YOUR MAIL ORDER BUSINESS

LOOK AT THESE LOW RATES

90c Per Word, Per Insertion — Minimum Ad—10 Words—**$9.00**

WHITE SPACE—**$5.00** Per Line.

CASH WITH ORDER

IF YOU SELL A PRODUCT OR SERVICE TO MEN, USE THIS EASY MEANS TO GET MORE SALES. TO BE INSERTED IN THE FEBRUARY ISSUE, YOUR ORDER MUST REACH US BY DECEMBER 22ND. FREE BOOKLET TELLS YOU "HOW TO MAKE MONEY OUT OF CLASSIFIED ADVERTISING."

Copyrighted material

FABULOUS U.S. SPRINGFIELD RIFLE FIND

BACK FROM BRITAIN. This may be the last lot of the famous U.S. Springfield Model 1903, CALIBER 30-06, ever located for public sale. We believe these guns were shipped over early in WW II. They are GUARANTEED EXCELLENT. In other words, they are in beautiful shape! This is the most accurate and dependable military rifle ever made and an all-time favorite hunting weapon without alteration. It is the late model high-number weapon also used with scope rifle by marine troops on Guadalcanal and in Korea. A powerful and accurate rifle at extreme ranges. Softnose hunting ammunition (30/06) sold everywhere. For C.O.D. send $10 deposit..... **$59.95**

HUNTERS! CONFISCATED RUSSIAN RIFLES

This is the late Russian Model 7.62 MM Moisin Rifle, approx. 30" barrel. Mechanically perfect. Outside: good. Bore: fair. Ballistics: 2820 F.P.S. with 150 grain bullet. Ammunition available everywhere in U.S., an excellent hunting cartridge. Hinged floor plate. Russian ordnance marks on receiver. The Russians won the International Meet in Venezuela (1954) with this model rifle. These guns were confiscated from Communist revolutionaries and placed on the free world market. They are of the type used by Red Chinese in Korea. The sale of these guns in no way aids any country behind the iron curtain. A Once-In-A-Lifetime collector's item. This is the lowest price we have ever seen which would allow a man to equip himself for big game hunting. **RUSSIAN RIFLE AMMUNITION FREE. 20 rds. full jacketed ammunition included with each rifle purchase. Additional cartridges: $7.50 per 100 rds.** For C.O.D. rifle send $5 deposit..... **$14.50**

TO ORDER: Send check, cash or money order. Shipped F.O.B. Pasadena. Calif. residents add 3% state tax.

GOLDEN STATE ARMS CORP. 90 Armory Bldg., 1165 E. Colorado St, Pasadena 1, Calif.

HY-SCORE PELLET PISTOL

NO PUMPING — $19.95 Single shot

LONGEST BARREL (10¼") — $22.95 6 Shot repeater.

The nearest thing to a regulation firearm. The man-size grip of a LUGER . . . 3 lb. match trigger pull . . . match target accuracy . . . effortless to load and economical to use!

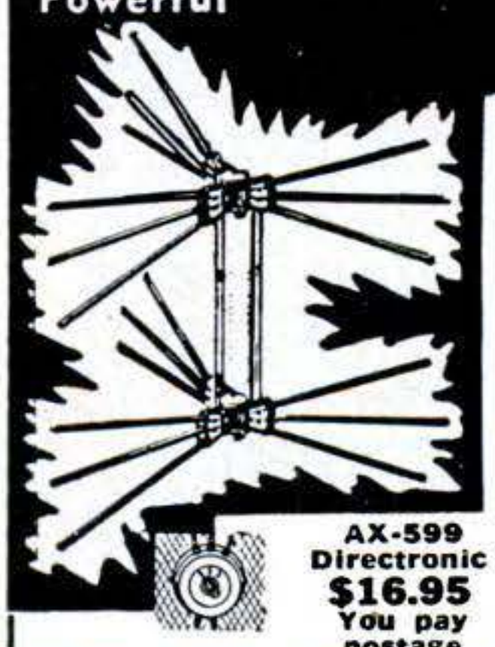
CAL. .177 OR .22

See your dealer or write Dept. SP-12 for literature

HY-SCORE ARMS CORP. BROOKLYN, N. Y.

Super Powerful

All Channel TV RECEPTION IN ALL DIRECTIONS



AX-599 Directronic $16.95 You pay postage

Rocket DIRECTRONIC MOTORLESS TV ANTENNA

360° Electronically Switched Beam

- **No Motors**
- **No Roof Orientation**
- **No Electric Power**
- **No Ghosts**
- **Flick of Switch Clears Picture Instantly**

In the city or in an ultra-fringe area, the Directronic will out-perform ordinary antennas. Only the Motorless 360° Directronic TV Antenna offers "around the compass" reception WITHOUT Rotors. Clarity of picture will amaze, it's so bright, so sharply defined. AX-599 "Serviceman's Array" contains Hi-Pac molded insulator of extremely high tensile strength, 18 hi-tensile aluminum alloy elements, 1 set connecting stubs (3), Universal U-Clamps for masts to 1½". Directronic Beam Selector, 75' Tri-X Cable. 25% deposit on C.O.D. orders, please. Money Back Guarantee.

NATIONAL ELECTRONICS OF CLEVELAND
6608 EUCLID AVE., DEPT. S-12 CLEVELAND 3, OHIO

WARN HUBS AUTOMATICALLY FREE-WHEEL 4-W.Ds. IN 2-WHEEL DRIVE

PATENTED

Free-wheeling 2-wheel drive stops front end drag! Cuts front end repairs 50% or more, saves gas, tires; gives amazing pep, performance, handling ease to 4 W.Ds! Warn *Automatics* engage or disengage front power train *as you shift* into 4-wheel drive, or out for fast, economical *free-wheeling* 2-wheel drive use. *Automatics only* also permit high speed driving in 4-wheel drive. Warn Automatic and Locking models for Willys factory approved, sold only by Willys dealers worldwide. Over 70,000 sets in use around the world. Models for other 4 W. Ds. at dealers or write:

RUGGED DESIGN PROVEN IN USE

WARN MFG. CO., Riverton Box 6064-B7, Seattle 88, Wash.

See the Greatest Show on Earth with this

GIANT ASTRONOMICAL TELESCOPE

$15.00 FULL PRICE

Delivered ready for use. Has 45X, 75X and 100 power individually mounted eyepieces with brass focusing tube plus sun projector lens for observing sun spots and solar storms. Steel telescope tube 50 in. long. Rigid 6 ft. tripod adjustable to any height. Steel forked mounting with closely machined aluminum tripod head assembly assures extra fine adjustments. This professional type instrument provides full power with clear vision at all times. See the moons of Jupiter, our own moon, planets, milky way, double stars, star clusters, etc. All for only $15.00 FOB Mattituck. Sent express. COD orders require $5.00 deposit. Satisfaction guaranteed. 200X and 400X eyepieces available at $2.00 ea.

SUFFOLK SCIENCE SERVICE
Dept. ATP-12 MATTITUCK, N. Y.

"ATOMIC ANNIE" by Authenticast — THE WORLD'S MOST FORMIDABLE ARTILLERY PIECE

A 1" to 9" scale model of the world's most formidable artillery piece, the 85 ton, 280 mm. Atomic Annie, and her 2 prime movers. Cannon is completely and accurately detailed, including massive turntable, and detaches from 2 huge, 6-wheel tractor-trucks which actually move and maneuver with the gun.

5189 ATOMIC CANNON T-10 $ 5.00

SEND FOR BRAND NEW CATALOGUE TODAY! 35¢

COMET METAL PRODUCTS CO., INC. RICHMOND HILL 18, NEW YORK

Copyrighted material

200 WATT SECONDS!

STROBOFLASH III

That's the amount of energy at your command in the Stroboflash III, shown in use here on a Pacemaker Graphic. Here is the finest portable electronic flash unit on the market! It has a flash duration of 1/500 second, a recharging time of six seconds (you can hardly change bulbs that fast!) and a guide number on fast pan of 450! If you don't need that much light, try the Stroboflash I or II . . . both have less output and are adequate for most photographers. Use them on the Pacemaker Graphic, the Graphic 35 or any camera with "X" synchronized shutter and you'll enjoy perfect, low-cost lighting for black and white or color! Write for free folder. Dept. PS-125, Graflex, Inc., Rochester 8, N. Y.

GRAFLEX® *Prize-Winning Cameras*

TELEPHONES

Desk Stand Style

Slightly used but in excellent condition

Many Valuable Uses

Inter-House Phones — House to Barn, etc.
Loud Speakers — Microphones
Educational Purposes, Toys, etc.

Comes complete, ready to use with wiring diagrams included. Two complete for only $5.00 **$2.75** Postpaid in U.S.A.

TELEPHONE LAMP KIT—with illustrated instructions for making Desk Telephone Lamp including all parts (harp, nipples, push switch, cord, plug, etc.) . . . . $6.50 Ppd. (Shade is not included).

MICROPHONE, Dept. X-2904, 1760 W. Lunt Ave., Chicago 26, Ill.

Have Fun, Entertainment... IMPROVE YOUR SHOOTING SKILL

The Real "McCoy" of Home Shooting Sets!

WITH THE EXCITING NEW

BENJAMIN TARGET PRACTICE OUTFIT

Now you can enjoy hours of Target Shooting with the new BENJAMIN TARGET PRACTICE OUTFIT. Contains all the gear you need for setting up a Pistol Range in Basement or Outdoors, including the Famous BENJAMIN SUPER CO_2 ROCKET GAS PISTOL with 2-Stage HI-LO JET POWER for shooting BENJAMIN H-C PELLETS, bullseye Bell Target, 100 Paper Target Inserts, 5 Standard Size CO_2 (Soda) Cartridges, Sample Supply of BENJAMIN H-C PELLETS, and Instruction Sheet. A PERFECT GIFT!

No. 262-T BENJAMIN TARGET PRACTICE OUTFIT, Cal. .22.....$17.95
No. 267-T BENJAMIN TARGET PRACTICE OUTFIT, Cal. .177.....$17.95

OUTFIT with Cal. .177 or .22 CO_2 ROCKET Gas Pistol $17.95

SENSATIONAL NEW

BENJAMIN SUPER CO_2 ROCKET GAS PISTOL with 2-Stage HI-LO JET POWER PISTOL ONLY $15.00

Cal. .177 or .22

Single Shot

Benjamin CO_2 CARBINE Rifle with HI-LO Jet Power $16.50

HARD HITTING — ACCURATE — ECONOMICAL
SAFE - CONVENIENT - PRACTICAL - NON TOXIC

EASY TO OPERATE—NO PUMPING—NO FLINCHING. Get 50 SHOTS from each 10¢ STANDARD SIZE CO_2 (Soda) CARTRIDGE. Up to ⅜" penetration. RIFLED—Shoots .177 or .22 Benjamin H-C Pellets and Darts. **For TARGET and SMALL GAME.**

FREE FOLDER

BENJAMIN AIR RIFLE CO., 811 BARRY ST., ST. LOUIS 4, MO., U.S.A.

Put Up This APPROVED Fireplace and Chimney YOURSELF in 4 Hours

NO MORTAR .. NO MASONRY

For 1, 1½ or 2-story houses

Save more than half! Full-sized wood-burning fireplace and chimney. Safety clearances built in. Labeled by Underwriters Laboratories Inc. Sets right against wood floors, walls, studs, joists. Fully engineered, tested, proved — won't smoke. Triple-wall chimney of stainless steel and aluminum. Realistic brick-finish aluminum top. Write for FREE details!

Add any mantel design

Majestic THULMAN FIREPLACE

The Majestic Co., Inc., 467 Erie St., Huntington, Ind.

KIDS! "BIG" RACKET

Make your Bike sound and feel like a real Motorcycle. Adjustable amplifier for normal or loud noise. Simply attached with screw driver, *only* **$1**

BIG RACKET MFG. CO.
Box 2121 Colorado Springs, Colo.

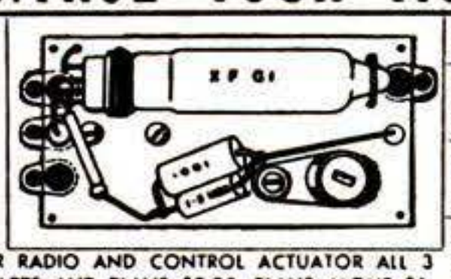
RADIO CONTROL YOUR MODEL

PLANES BOATS CARS

"CUSTOM MIDGET" RADIO ONLY **$9.98**

LICENSE FREE BAND

OPERATES SAME AS $50.00 SETS. INCLUDES LONG RANGE TRANSMITTER RADIO, RECEIVER RADIO AND CONTROL ACTUATOR ALL 3 EASY ASSEMBLY WITH OUR PARTS AND PLANS $9.98. PLANS ALONE $1.



DETAILED INFORMATION & RADIO CATALOGUE 25c
SPECIAL "SUPPLY SOURCE DIRECTORY" & $7.00 SUPPLY COUPON . . $1.00
BOOK "RADIO CONTROL OF MODEL AIRCRAFT" CONTAINS 14 PLANS $3.98
RADIO CONTROL GARAGE DOOR DETAILS $1.00

RADIOMODELS BOX 36 DEPT. PS BALTIMORE 6, MARYLAND

Zing!

$1.50 POSTPAID MAIL TODAY!

SOCK-O

SUPER SLINGSHOT

SILENT • RIFLE FAST • POWERFUL • ACCURATE

Great for small game and target shooting! 45 pound pull. Big, sturdy stock. Lively raw rubber. Sweet shooting. Free! 50 Sock-O "cannon balls", extra rubber and target. Sent by return mail. Guaranteed. Every sling fully tested. No COD's please.

SOCK-O, 7000 Melrose, Los Angeles 38, Calif.

62 BALLOONS $1 THAT MAKE GIANT CIRCUS ANIMALS

GREAT FOR PARTIES. Instructions Included.
124 BALLOONS $1.75 — Packed in decorative Xmas stocking. ADD 10c POSTAGE PER ORDER.
Circus Balloons, Dept. 20 Scarsdale, N. Y.

DINSMORE AUTO COMPASS

with CONFIDENCE!

These modern, fully jeweled compasses show you the right way—the short cuts. Save time and money! Surpasses rigid auto makers' tests. **Send for Free Folder**—*"Pants—Knives and Compasses."*

ONLY COMPASS APPROVED BY AUTO MAKERS!

TRAVELITE (ILLUMINATED) $5.95

GUIDEWAY (NON-ILLUMINATED) $4.95

DINSMORE INSTRUMENT CO.
1814-43 KELSO ST., FLINT 1, MICHIGAN

Copyrighted material

KRUGER Pistol *Bargain* $3.00 post paid

.12 CALIBER

FULL PRICE!

Blue-black finish

SINGLE SHOT

Delivered free

FIRED BY .14 MG. POWDER CHARGE

Crafted after famous German Luger design. Not an air or CO_2 gun. This is a small bore gun that shoots small .12 caliber lead bullets fired by light .14 mg. powder charge. Beautiful gun, swell for target shooting. 4" steel barrel in knurled styrene stock. Overall length 8¾". Amazing low price due to ball and cap design, direct factory-to-you sales. Comes with 50 bullets. Send for extra bullets or available at stores. Money back if not satisfied.

KRUGER CORPORATION
KRUGER BUILDING, BOX K 26, ALHAMBRA, CALIF.

Please send . . . Kruger pistols, $3 each
Payment of $ . . . enclosed (No C.O.D.'s)

NAME . . . . . CITY . . . . . .
ADDRESS . . . . . STATE . . . . . .

REAL ESTATE

BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes. Start and run your **own business quickly.** Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in classrooms in leading cities. Diploma awarded. Write TODAY for free book! No obligation.

FREE BOOK TELLS HOW

Approved for World War II and Korean Veterans

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)
2022A Grand Avenue **Kansas City, Mo.**

ALSO "ESHELMAN" CHILD's 2 Passenger Motor Car

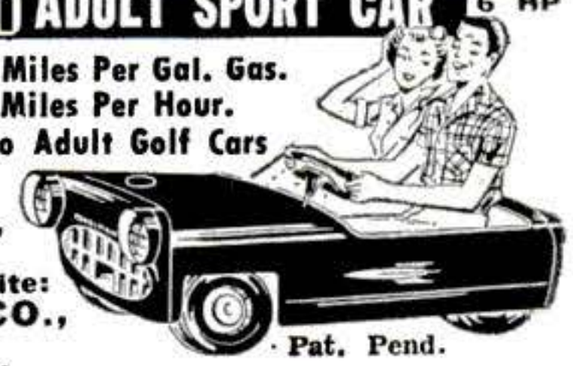
Eshelman Cars *Commended by Parents' Magazine*

Free Catalog

ESHELMAN ADULT SPORT CAR Model 6 HP

1/5 THE COST OF ANY OTHER AUTO

70 Miles Per Gal. Gas.
35 Miles Per Hour.
Also Adult Golf Cars



Shipping Points: Reno, Baltimore, Chicago
Free Catalog Write:
ESHELMAN CO.,
DEPT. MC-412
109 LIGHT ST.,
BALTO. 2, MD.

Pat. Pend.

Do you work all day with

COLD FEET?

NOW,

at last, a new, modern, low priced electric foot warmer that will keep you healthy, happy and comfortable

Check stand cashiers, secretaries, assembly line workers, housewives, office workers, theatre cashiers, machine operators, telephone operators, and many others throughout the country are now singing the praises of the Electro Mat. There is no further need to work all day with cold feet. Many colds, causing absenteeism and irritability, can be directly traced to cold feet. ***Safe and Economical***

Size 14" x 21" light-weight portable

Consumes less power than a 75 watt light bulb.

Mail your check or money order today for ONLY

$7.95

prepaid

PETERSON RUBBER MAT CO.
5508 No. Halifax Rd., Dept. PS-12, Arcadia, Calif.

Please send me__ Electro Mats at $7.95 each
IMPORTANT SAVING.
If 6 or more ordered, price is only $6.95 each.
☐ C.O.D. Enclose $1.00 deposit with order
☐ Prepaid

Name_____
Address_____
City_____State_____
PLEASE PRINT CLEARLY

COUPON

UNIVERSITY LOUDSPEAKERS, INC. Desk R-2
80 South Kensico Avenue, White Plains, N. Y.

Gentlemen:

Please send me information about P•S•E (University's Progressive Speaker Expansion plan for High Fidelity speaker systems).

I don't believe that P•S•E can do all you claim for it. According to you P•S•E will solve almost *all* my loudspeaker problems *forever*. That's a bold statement; I hope you can back it up.

You say that *now* I can buy a speaker and *never worry about it becoming obsolete*, or *improve my* present system *without discarding what I have* . . . that University speaker components, enclosures and networks have been so uniquely designed that it's possible to start an excellent basic system, *at low cost*, and add to it later—while enjoying immediate listening satisfaction. This is sensational!

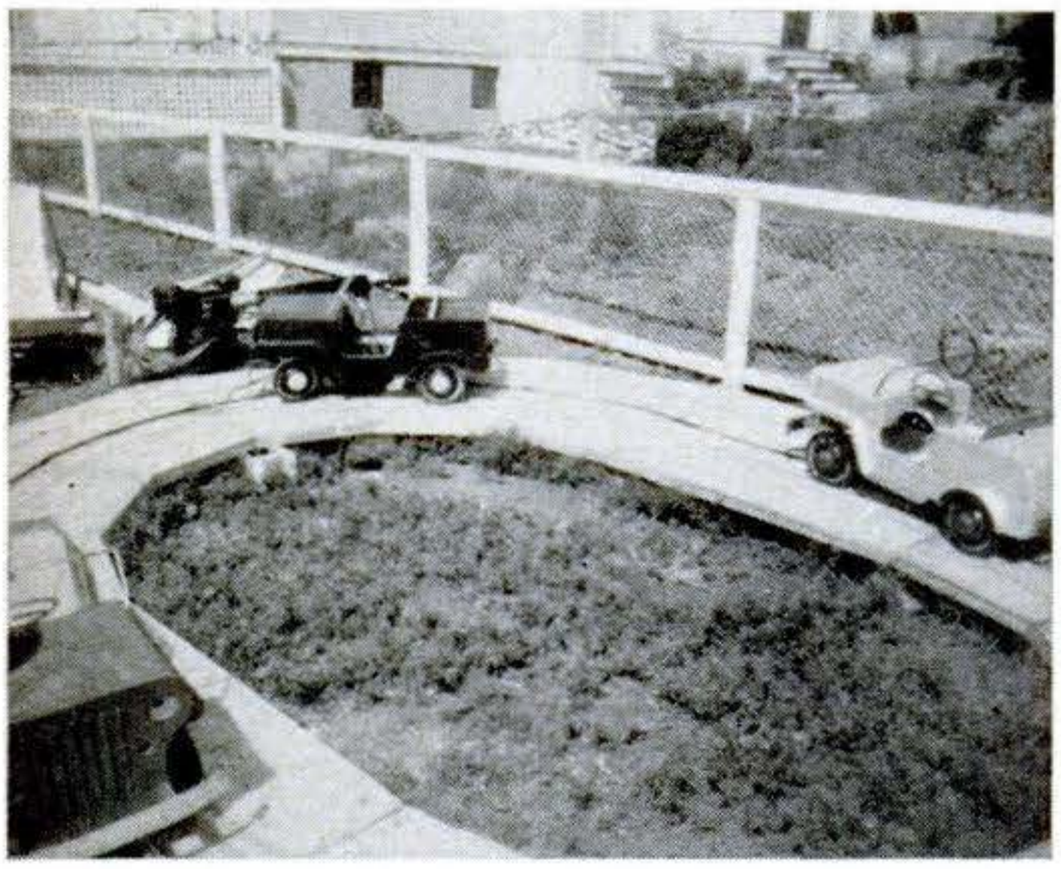
Please send further information; mind you at *no* cost to me; *absolutely free.*

NAME_____
ADDRESS_____
CITY_____STATE_____

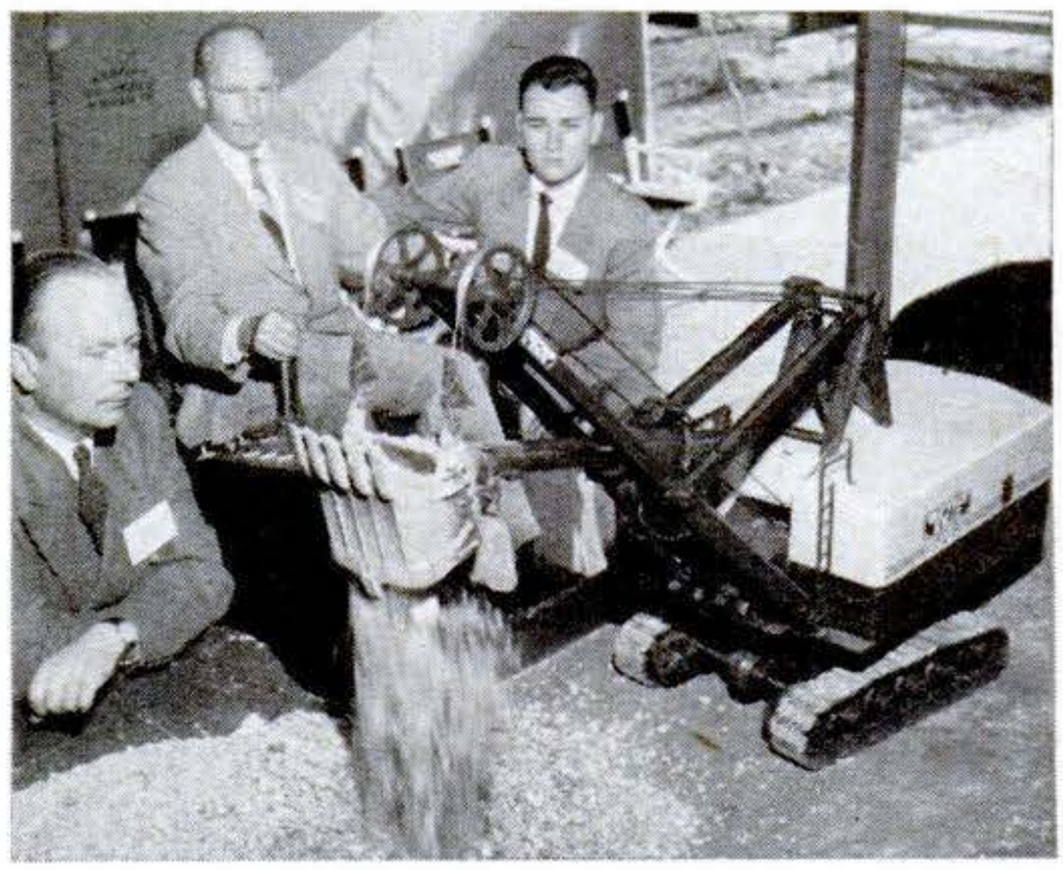
Copyrighted material

CRAFTSMEN AT WORK

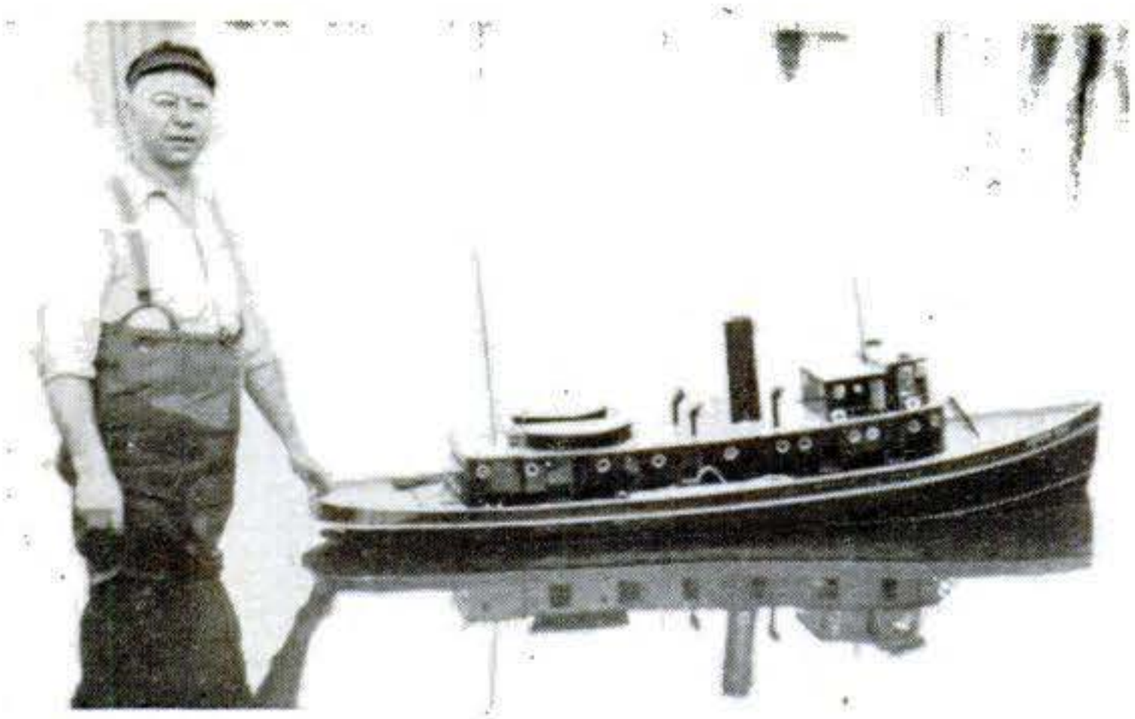
Props Made from Magnesium. A craftsman who builds 1½-hp. hydroplane units for sportsmen, Lee Renard of Utica, Ohio, found wooden propellers slow to turn out and balance. Now he saves time by bandsawing prop blanks from magnesium plate. Given a 10° twist and finished with a disk sander and buffing wheel, they're light, strong and practically vibration-free. At 2,000 r.p.m., they give a flat-bottomed boat a speed of from six to eight miles an hour.



Model Jeeps Run on Back-Yard Track. Juvenile traffic is heavy in Moose Jaw, Sask., when C. F. Wilson starts up the 5-hp. gasoline engine that hauls these midget jeeps around a 10′-by14′ outdoor oval track. An endless chain recessed in the platform's center slot provides the power link for his popular basement-built kiddies' ride.



Midget Shovel Scoops Up Orders. To demonstrate the performance of its latest electric power shovel at trade shows and conventions, Bucyrus-Erie has just built this 381-pound model of the huge earth mover. A full-size shovel control panel puts the one-twelfth-scale midget through every maneuver that is engineered into the big machine.

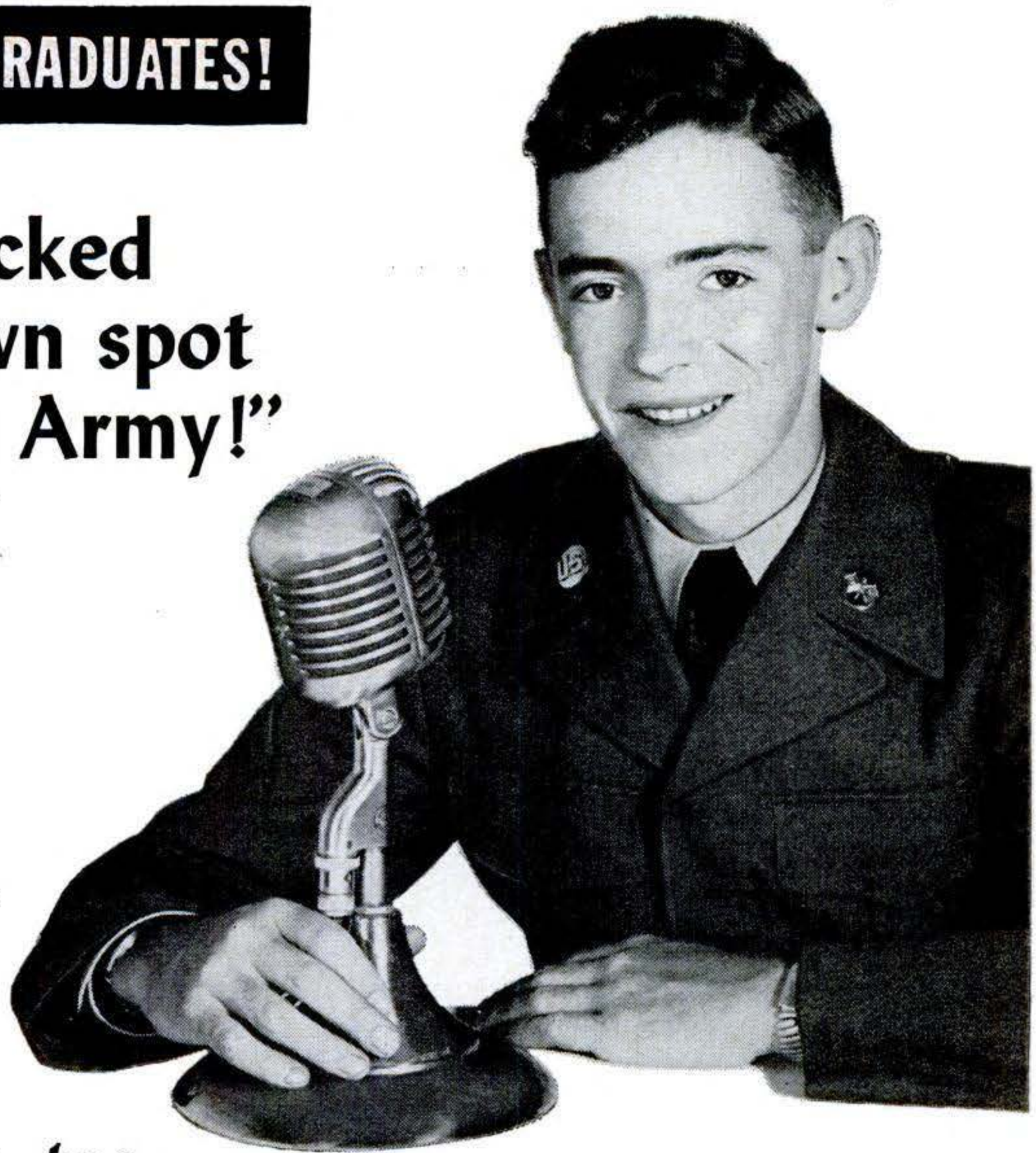


Cadillac of Tugboat Models. Seven feet long and weighing 65 pounds without ballast, this finely detailed model of a Great Lakes tug churns through the water at better than five knots, driven by a one-cylinder steam engine working at 125 pounds' pressure. General Motors' Cadillac Division power engineer Ray Tarenski spent eight months building the aluminum hull, the engine and the superstructure from scratch. The boiler is fired by a blowtorch under air pressure.

Copyrighted material

HIGH SCHOOL GRADUATES!

"I picked my own spot in the Army!"



PFC. JOHN L. MILLER
Franklin, New York
Graduate, Franklin Central School

"You can, too— by choosing your training before enlistment

"Yes—and I speak from experience! Right now I'm an Army specialist in radio repair. I picked the course myself—and studied at an Army school. In fact, I've done so well that the Army's now giving me a *second* course in *television!* So you see, I'm pretty well set! And it's all because I entered the Army the *right* way . . . by *reserving* my training *before* enlistment. What's more, *you* can do the *same!*

Over 100 courses ready and waiting!

"There are over 100 courses to choose from—aviation, engineering, communications, medicine, guided missiles, photography—almost anything you're interested in. And you couldn't ask for finer training or better equipment. Your schooling is *guaranteed!* No if's, and's, or but's about it! The course you select is the course you'll *get*—or you *don't* enlist! That way you can't lose!

How you can qualify

"If you have a high school diploma or its equivalent, or if you are a high school senior, you can reserve your Army schooling right *now!* See if this isn't just the deal you've been looking for."

Get CHOICE— not chance, in the Army!

FOR FULL DETAILS, CLIP THIS COUPON AND MAIL IT TODAY!

THE ADJUTANT GENERAL PS 56-1
Department of the Army,
Washington 25, D.C.
Attn: AGSN

Please send me the Army booklet describing special opportunities for high school graduates.

MR. .....

ADDRESS .....

CITY ..... STATE .... DATE OF GRAD. .....

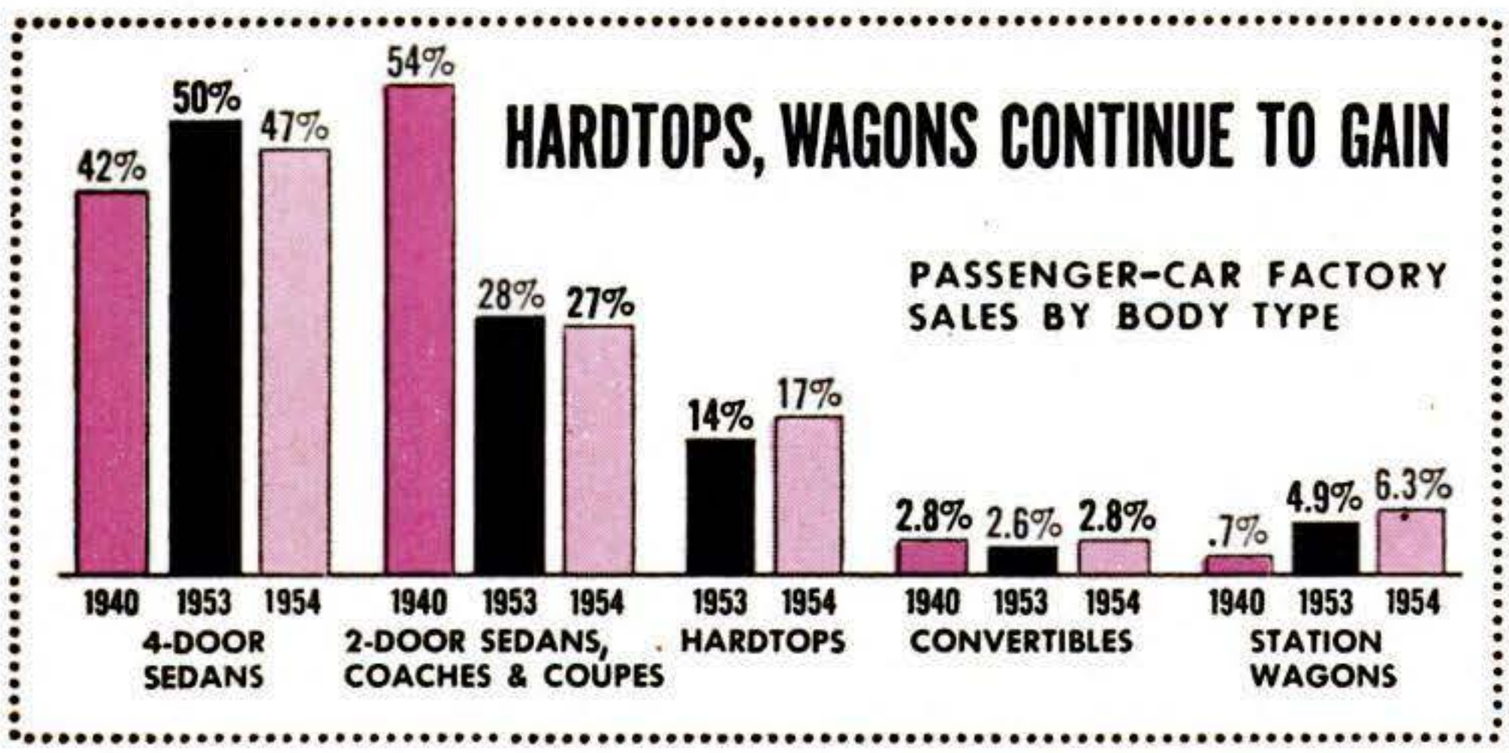
Copyrighted material

POPULAR SCIENCE MONTHLY

LATE NEWS...

Work on a tamed H-bomb for generating electricity is already under way at five U.S. laboratories: Princeton, NYU, Los Alamos, Oak Ridge and Livermore. The obvious difficulties involved in operating such a miniature sun on earth--controlling its 100,000,000° heat and avoiding an explosion--seem to have been licked, the Atomic Energy Commission indicates without explaining how. The problem now, the scientists say, is getting more power out than must be put in to keep the reaction going.

They're building the "moons" that Project Vanguard will fire into space in '57 or '58. The contract for the first "bird" went to Glenn L. Martin Co., which makes the Navy's Viking rockets. General Electric will build the first-stage rocket motor.



Automobile Manufacturers Association

Electric door locks are Detroit's latest safety idea. They would keep car doors shut until you pushed a button on the dash. At least one maker is expected to introduce them soon . . . THE AAA IS CHEERING ON the auto safety race. The Association urged manufacturers "to tone down their emphasis on horsepower and devote more thought to ways of protecting the driver."

The victory over polio seemed secure this fall. Some 7,000,000 children got Salk shots. They contracted 25 to 50 percent less polio than unvaccinated youngsters.

Pilots understand radio messages better, especially when there is static, if the speaker stutters. "Wuh-one, tuh-two" is clearer than "one, two." Ohio State researchers also found that a kind of electronic stuttering increases clarity. This they call "delayed hearing." It involves feeding the sound to one of the hearer's ears a fraction of a second after it is fed to the other ear.

Antibiotics may soon preserve food as well as cure disease and fatten livestock. A dash of Terramycin keeps milk fresh for weeks, and doubles the shelf life of salad greens.

Research rockets will be caught on the fly if an Australian scheme works out. The rockets have parachutes to lower them back to earth, but are often damaged by bumpy landings. To catch them in the air, a pilot will tow a line having grapnels, maneuvering so that his grapnels hook a line trailing from each rocket's parachute. The pilot will then fly down a gully spanned by cables and transfer his catch to these cables.

New book. The universe according to Hoyle (Cambridge University's Fred Hoyle, that is) gets a sprightly treatment in *Frontiers of Astronomy* (Harper & Brothers, New York, $2.50). Hoyle explains everything from the center of the earth to the farthest stars. Illustrations are outstanding.

Copyrighted material

THE FABULOUS '56 PONTIAC WITH A BIG AND VITAL GENERAL MOTORS "AUTOMOTIVE FIRST"!

Believe us—it isn't easy to impress a test driver!

But they're cheering Pontiac in a big way.

What's set them buzzing is that big and vital General Motors "First" combining:

Pontiac's new big-bore Strato-Streak V-8 with the terrific thrust of 227 horsepower.

General Motors' new Strato-Flight Hydra-Matic that gentles this mighty "go" to smoothness beyond belief.*

You don't need a test track to prove that here is the lift of a lifetime.

Traffic tells you. Here's "stop-and-go" response as fast as thought itself. *A hill helps.* High or low, it's left behind without a sign of effort. *And passing definitely pins it down.* Gun it and instant, flashing power sweeps you swiftly by the loitering car ahead. No drag, no lag—just safe and certain "go"!

There's plenty more to charm you. The safety of big new brakes, a steady ride, advanced controls. Glamorous new beauty.

But, above all, it's that fabulous new "go" that gets you!

Drive a Pontiac today for a glorious double thrill. There'll be pride in your heart, a torrent at your toe-tip. What more could anyone want?

**An extra cost option*

'56 PONTIAC

PONTIAC MOTOR DIVISION OF GENERAL MOTORS CORPORATION

Copyrighted material

If you drive one of these cars . . . BUICK, CADILLAC, CHEVROLET, CHRYSLER, DODGE, FORD, HUDSON, MERCURY, NASH, OLDSMOBILE, PLYMOUTH, PONTIAC, STUDEBAKER, **here's a sure-fire way to get all the horsepower and performance you paid for!**

DOMESTIC SERVICE
Check the class of service desired; otherwise this message will be sent as a full rate telegram

FULL RATE TELEGRAM	
DAY LETTER	
NIGHT LETTER	

$
S
E

WESTERN UNION

1206 10-51

W. P. MARSHALL, PRESIDENT

INTERNATIONAL SERVICE
Check the class of service desired; otherwise the message will be sent at the full rate

FULL RATE	
LETTER TELEGRAM	
SHIP RADIOGRAM	

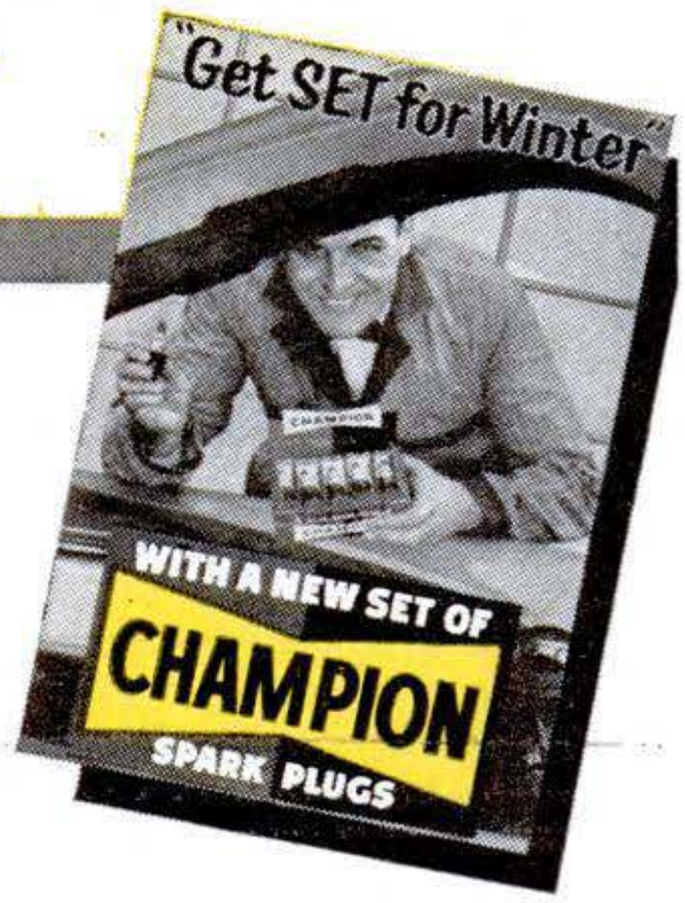
NO. WDS.-CL. OF SVC.	PD. OR COLL.	CASH NO.	CHARGE TO THE ACCOUNT OF	TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

CHAMPION SPARK PLUG COMPANY
TOLEDO, OHIO

FOR THE SECOND STRAIGHT YEAR OUR OFFICIAL RECORDS SHOW THAT EVERY SINGLE CAR PARTICIPATING IN THE ANNUAL SOUTHERN 500 STOCK CAR RACE SANCTIONED BY NASCAR WAS EQUIPPED WITH CHAMPION SPARK PLUGS PURCHASED AT THE TRACK. LAST YEAR THE ENTIRE FIELD OF 52 RAN ON CHAMPIONS. THIS YEAR 69 OUT OF 69 USED CHAMPIONS WITH 13 DIFFERENT MAKES OF CARS COMPETING. THE FIELD WAS MADE UP OF FORD, CHEVROLET, MERCURY, PONTIAC, OLDSMOBILE, BUICK, CADILLAC, PLYMOUTH, DODGE, CHRYSLER, NASH, STUDEBAKER AND HUDSON. THIS IS ABOUT AS FINE PROOF AS YOU WOULD WANT THAT YOUR SLOGAN "BETTER BY FAR FOR EVERY CAR" IS 100 PER CENT RIGHT.

BOB COLVIN, PRESIDENT, DARLINGTON RACEWAY



Why settle for claims when it's *results* you want from spark plugs! Claims didn't count at Darlington when all stock cars in the classic Southern "500"—*cars exactly like yours*—were tuned to razor-sharp perfection by the nation's best mechanics.

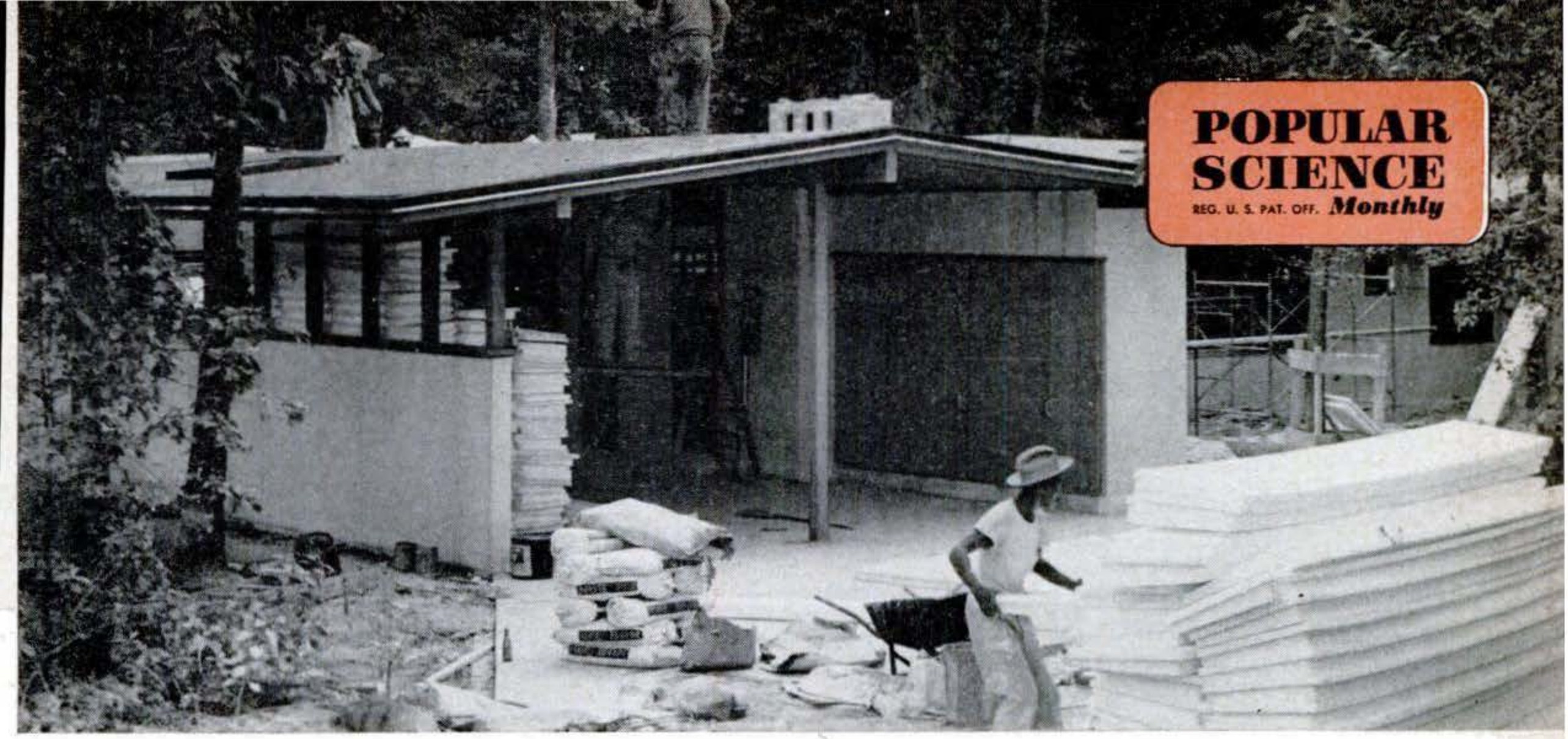
Only *results* pay off—so full-firing, 5-rib Champions were installed in every car which did not already have them for extra horsepower and performance.

Give *your* car a chance to show what it can do. You're paying for top performance. Get it with Champions!

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

Any car is better with 5-rib Champion Spark Plugs!

Copyrighted material



POPULAR SCIENCE
REG. U. S. PAT. OFF. Monthly

Will tomorrow's home have plastic walls and roof? This house in Texas, which does, may point the way.

He Built His House of Foam

THE snowlike foamed plastic you see in window displays is probably the last material that you'd expect to use to build a house. But that's exactly what was used to make the load-bearing walls and roof of a handsome new home in Houston, Tex.

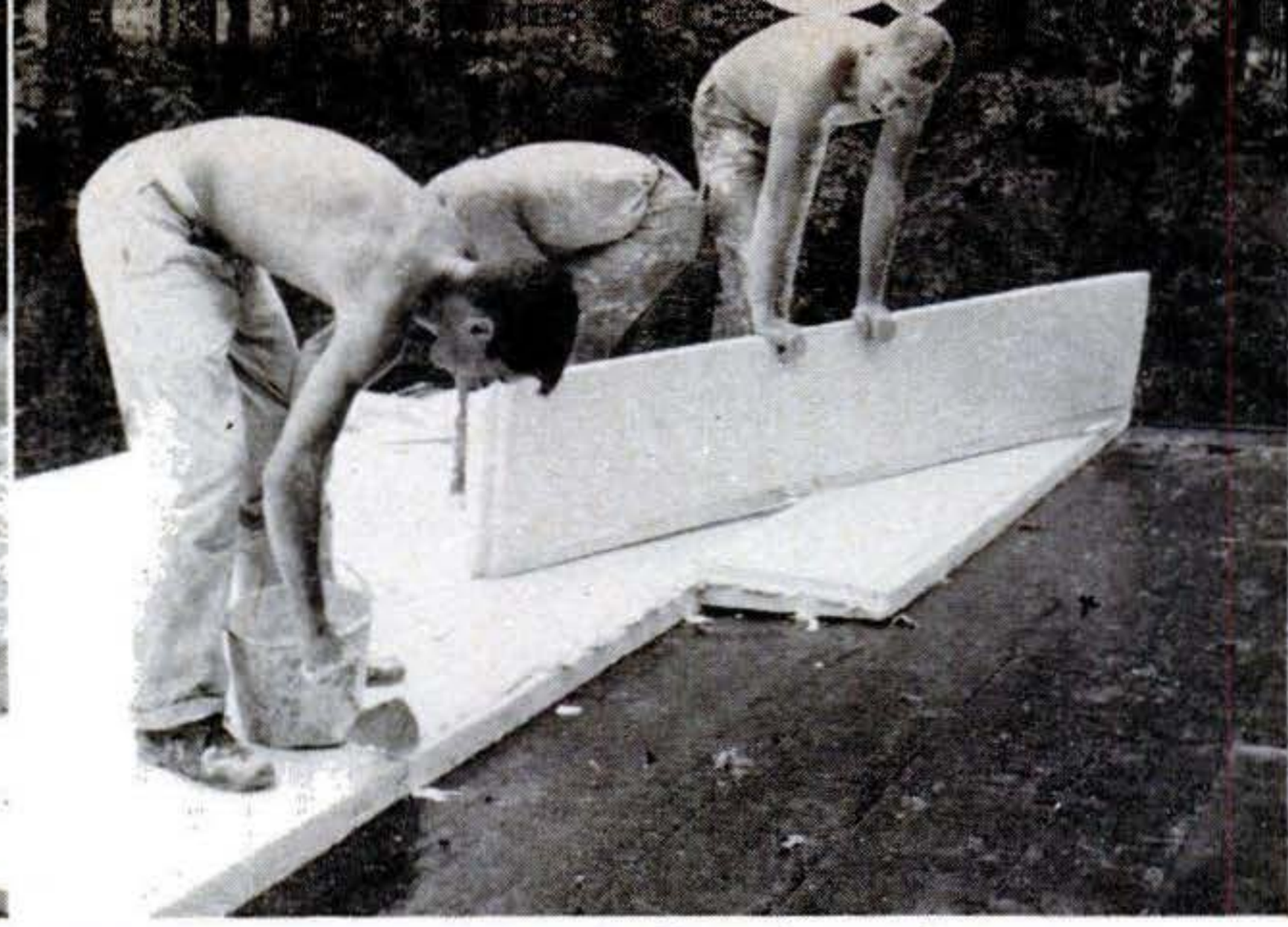
The owner, Dean Emerson, thought of building with Styrofoam because he is a wholesale distributor of the stuff. But no contractor would touch the job. So Emerson went ahead and started building the house himself. When he moves in next month, he will have a better than ordinary house, and one that cost him about 15 percent less money.

The Emerson house may well mark a turning point in the venerable art of home building. It is one of the first meant-to-be-lived-in dwellings to rely on plastic for structural strength. The plastic

IT'S NO FEAT for Dean Emerson to lift a slab of the plastic used to build his house. Piece nine feet long weighs only 4½ pounds.

Copyrighted material

PUSH BOX SPREADS CEMENT over plastic slabs to make them rigid. These are roof shingles, cut to shape from standard rectangular slabs. Note flexibility of uncoated slabs (background).

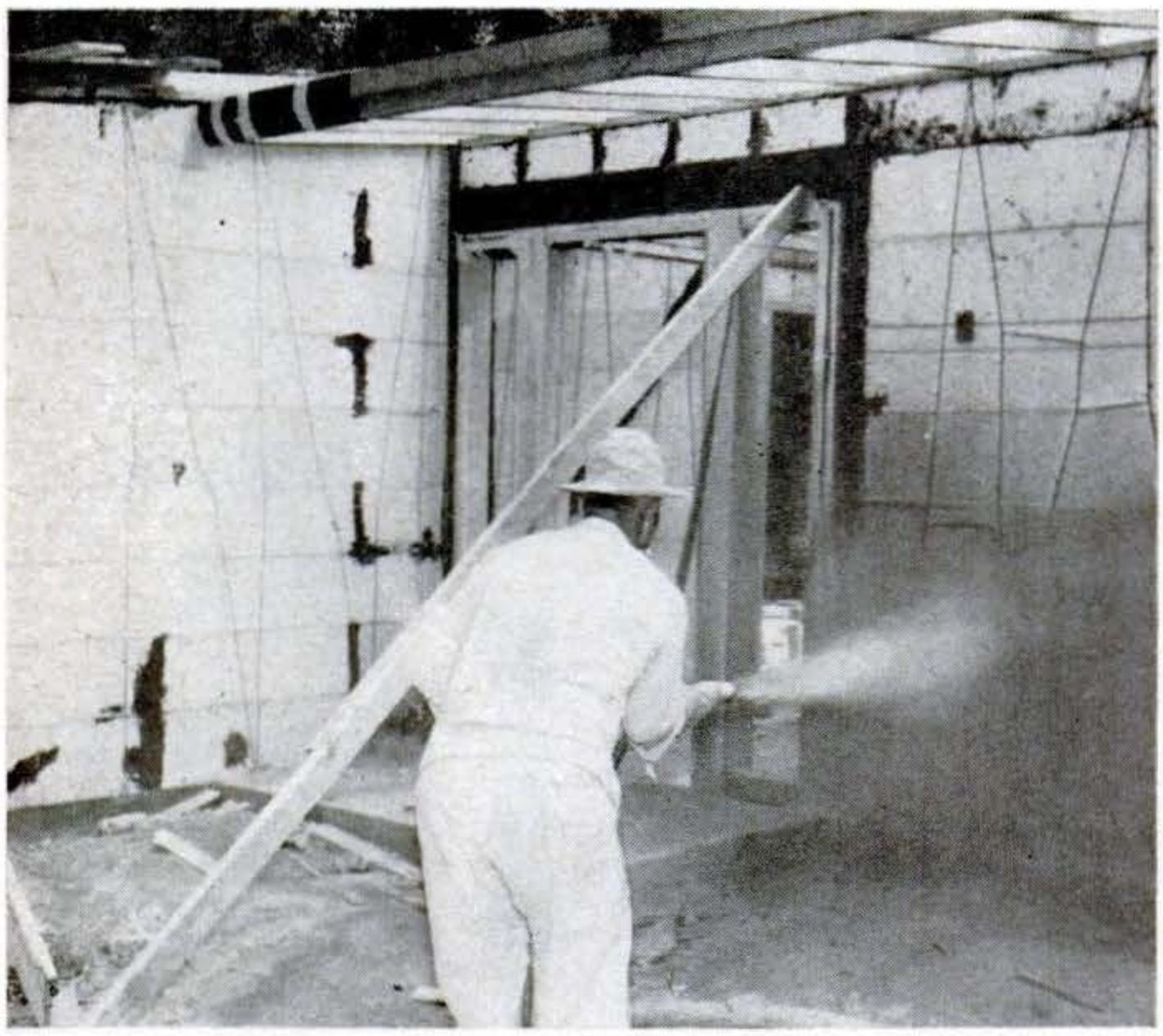


YOU CAN STAND ON IT. And workmen do just that as they lay roof shingles in mortar. Under shingles is a tarred wooden deck. Emerson says that you could build a bonfire on his roof.

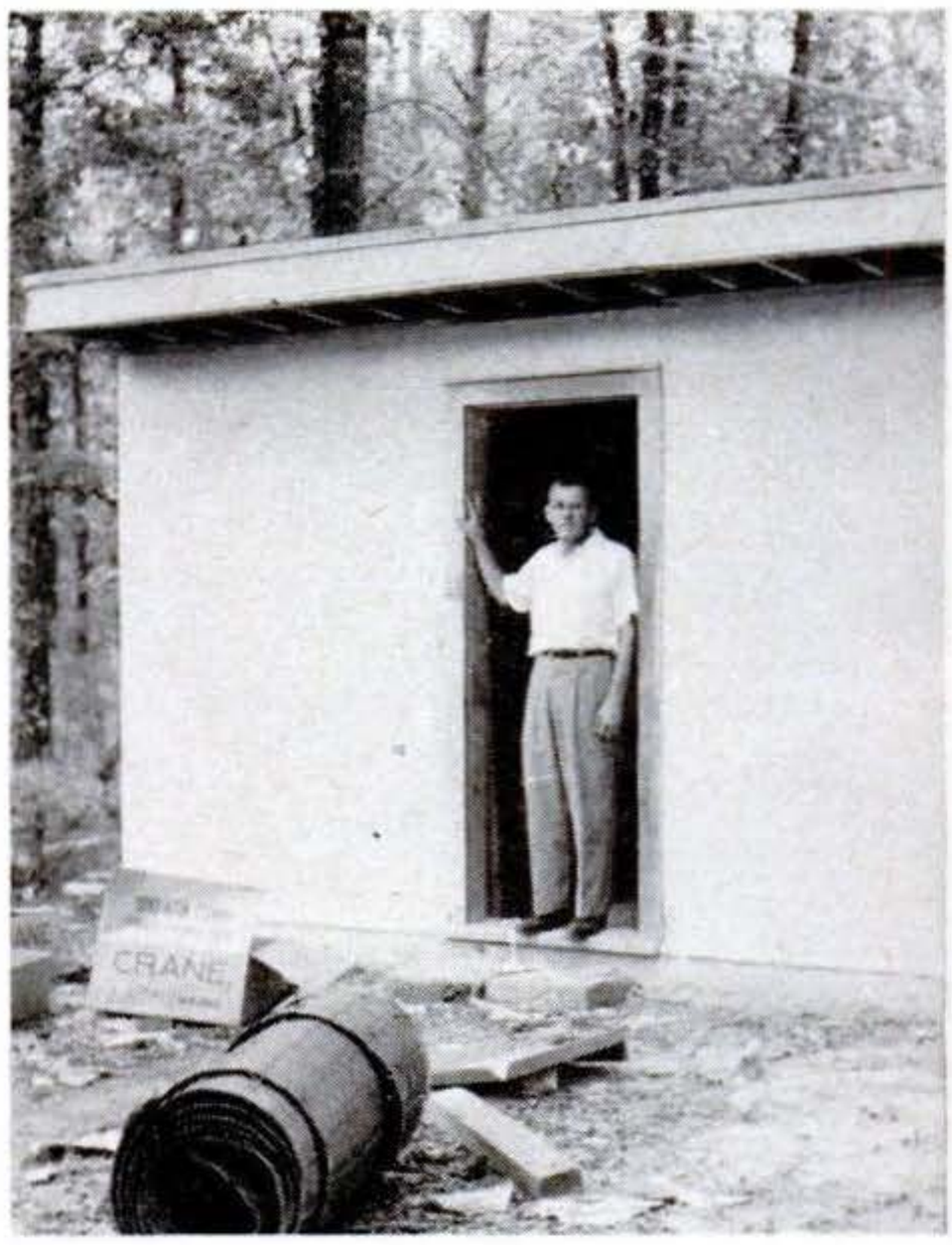
here is not decoration or window glazing. It holds the roof up and keeps the rain out. You can't see any of the plastic—it is all covered with cement or plaster—and the house looks like a conventional stucco job.

Styrofoam is mostly air: a moderately hard block of foamed polystyrene plastic. It sparkles so prettily and shapes so easily that it is widely used for florists' displays and store-window decorations. One of the best low-temperature insulations, it is also waterproof, a good vapor barrier, fire resistant, and distasteful to bugs and rats.

How to make it strong. Houston engineer Francis J. Niven figured that out. He stacked the plastic slabs like logs—no mortar, just mastic between vertical joints only. Then he tied the stack on both sides with steel wire strung between a timber plate and the concrete slab foundation, applying tension that practically welded the individual slabs to-

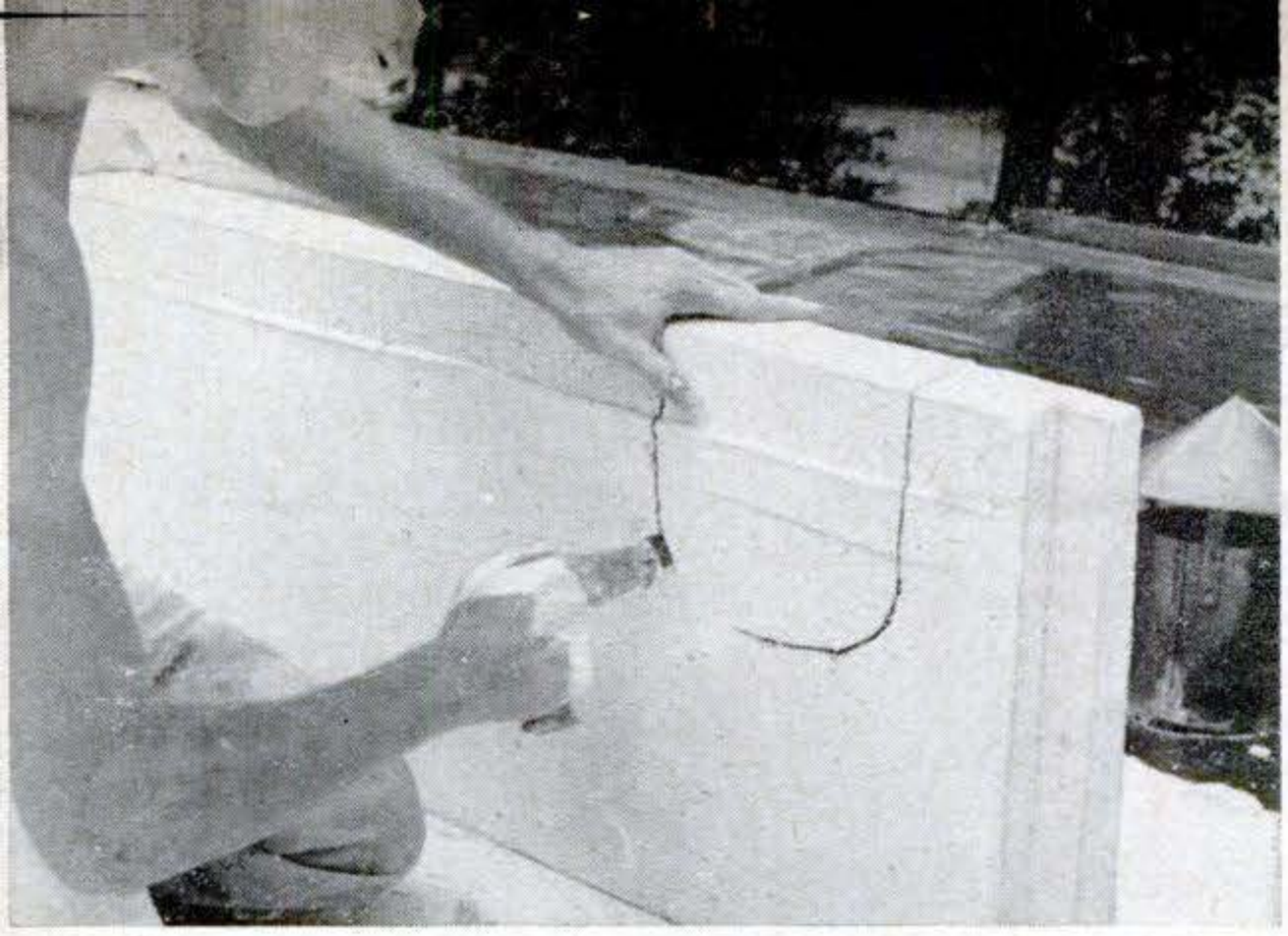


SPRAYED-ON CONCRETE an inch thick makes outside layer of walls. Note the tensioning wires, which contribute much to strength, on unsprayed part. Interior is sprayed with an inch of plaster to make a standard five-inch-thick wall.



TEST BUILDING, put up two years ago, proved durability of plastic construction. The building will be used as a guest house now.

Copyrighted material



EASY CUTTING, with saw or knife, makes construction go fast. To make room for pipes or wires in solid exterior walls, workmen scratch a groove of the right depth with a knife.

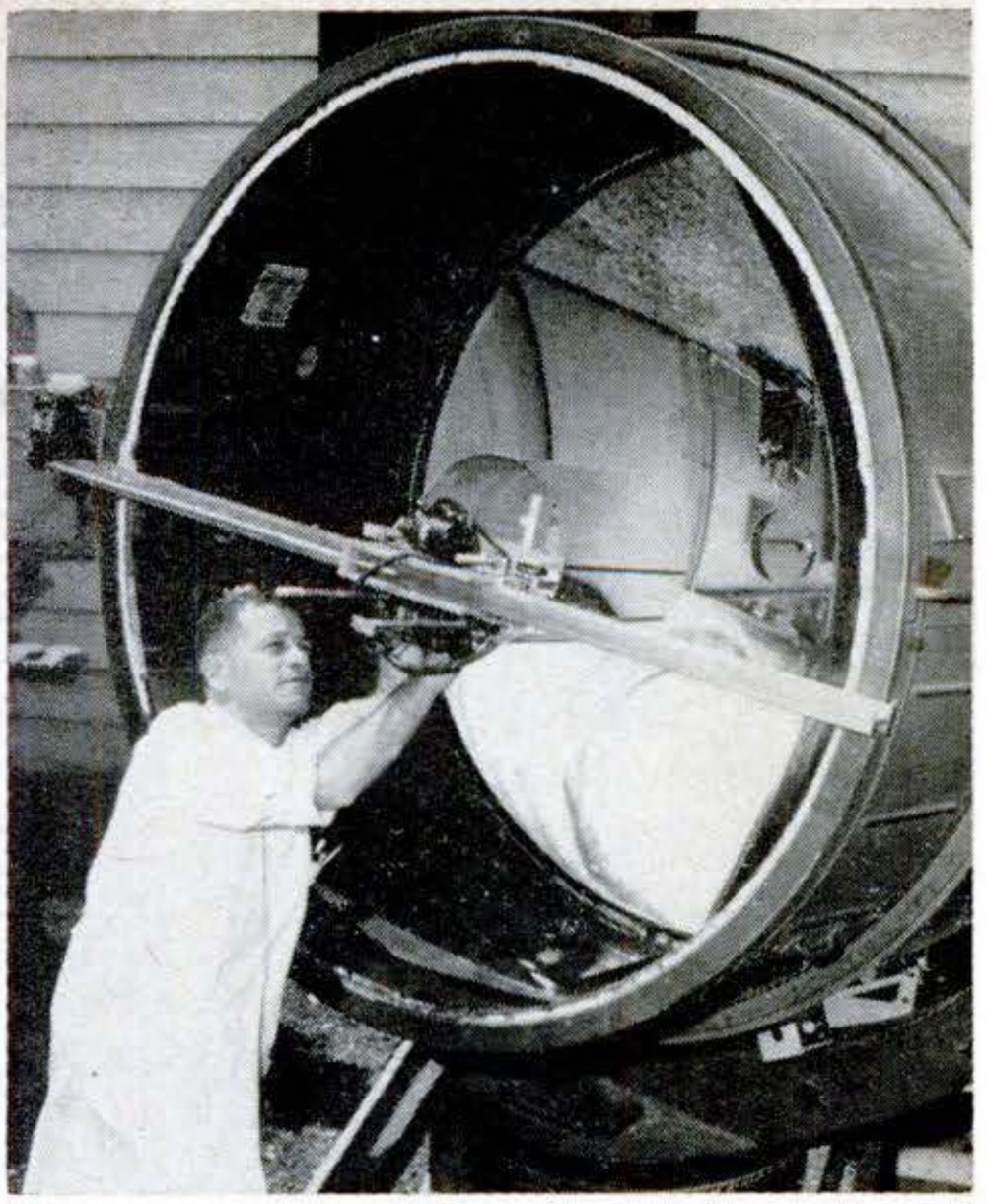
gether. Finally he sprayed an inch of concrete on the exterior and an inch of plaster on the interior. The rough plastic surface bonds to the concrete and plaster better than lath would, making a solid sandwich five inches thick. Result: a wall with twice the compressive strength that the building code requires and one that could stand up to a 200-mile-an-hour hurricane.

That's how the walls of the Emerson house are built. Emerson figures he saved 10 percent on wall cost, largely because Styrofoam is so light in weight and easy to cut that the work went fast. With the assembly-line methods that a builder would employ on development houses, the new method should prove to be still more economical.

A big saving came from Styrofoam's insulating effectiveness. This made possible heating and air-conditioning units a third smaller than a conventional house of the same size would require.

The roof is also Styrofoam, laid as shingles in mortar over a built-up deck of wood, tar and felt. A flat Styrofoam roof would have been simpler and cheaper, requiring no shaping of the plastic slabs and no deck underneath them. But Mrs. Emerson doesn't like the looks of a flat-roofed house.

In one room where Emerson wanted a marble floor, the subflooring is Styrofoam. Over the plastic, thin marble tiles safely support a grand piano. END



Solar Heat Melts Minerals

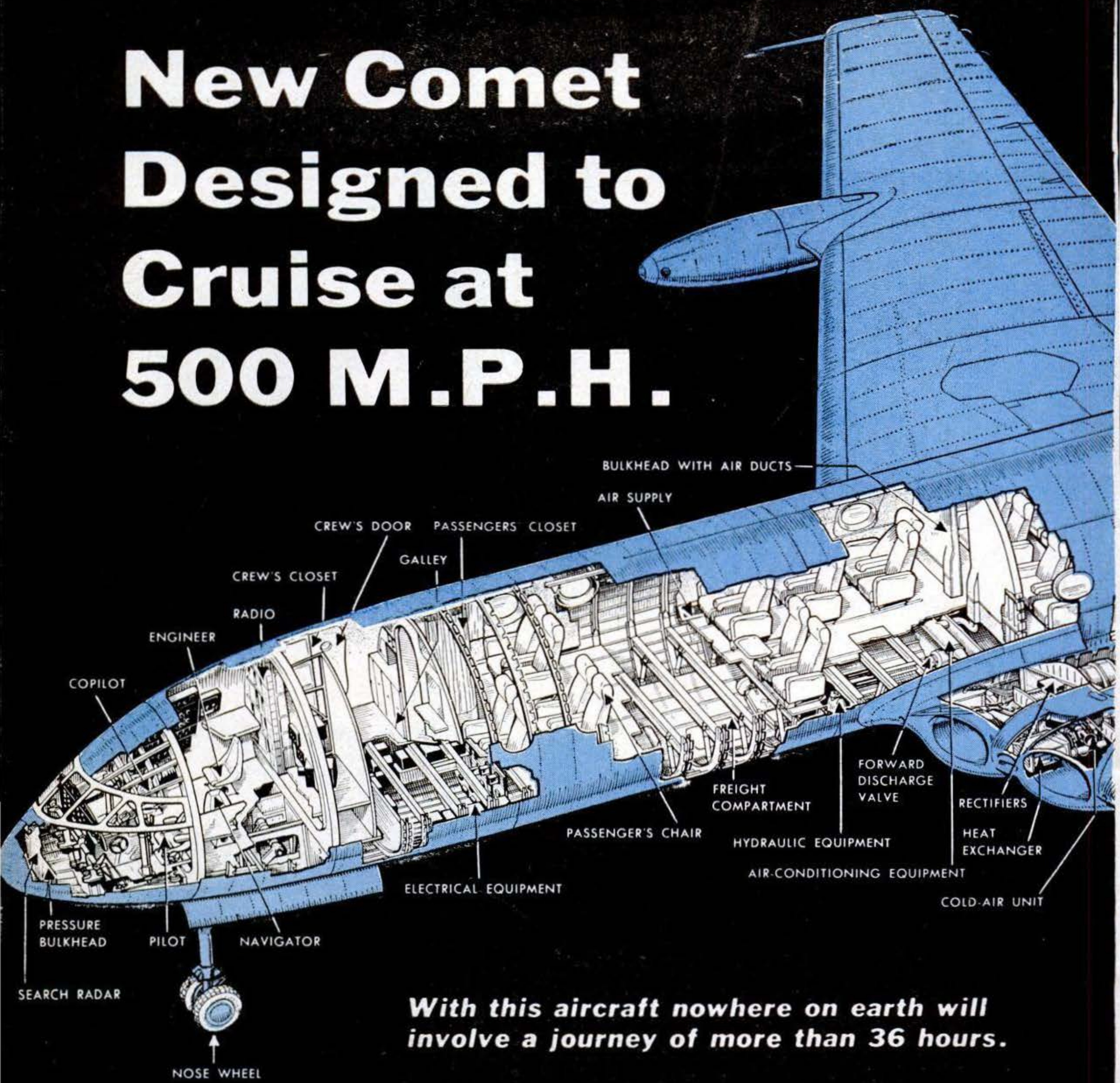
VAPORIZING diamonds, melting granite or burning holes in zircon takes only a few seconds in a solar furnace adapted from a surplus Army searchlight by a Fordham University scientist. Its 60-inch mirror focuses the sun's rays to create temperatures above 9,000 degrees.

Warm Hands Take Cold Cash

FINGERLESS gloves, necessary for making change, are little protection for toll collectors when it's cold outside. This hand warmer—a section of pipe containing a heating element—solves the problem at the Benjamin Franklin Bridge connecting Philadelphia with Camden, N. J.

Copyrighted material

New Comet Designed to Cruise at 500 M.P.H.

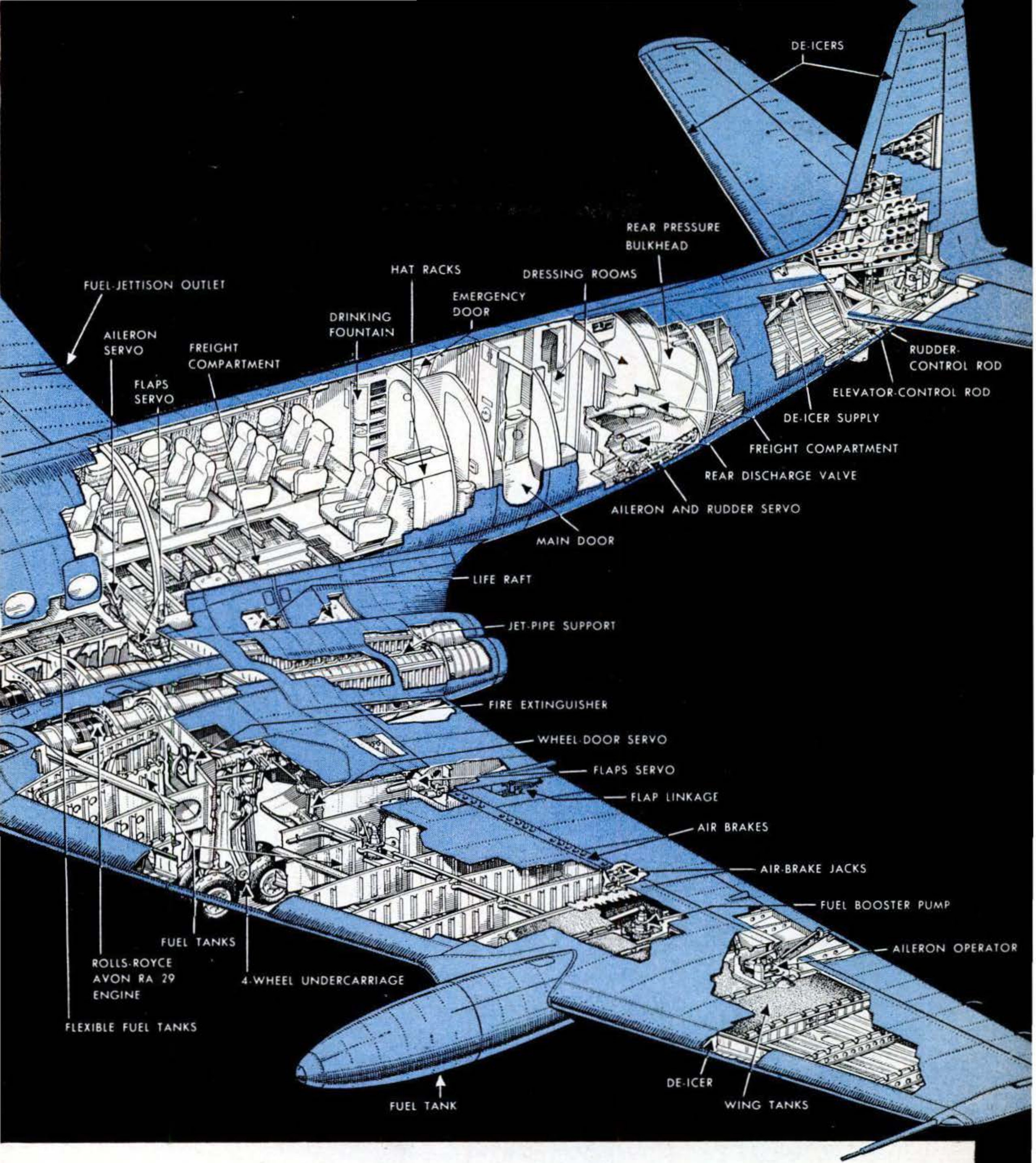


With this aircraft nowhere on earth will involve a journey of more than 36 hours.

NEW YORK to San Francisco in nearly an hour less than you could now fly from New York to Denver. Not in an Air Force plane, but in a commercial airliner seating 76 people.

That's what Britain's newest jet transport, the Comet Mark IV, is being designed to do. Its four Rolls-Royce Avon engines will whip it through high altitudes at 500-mile-an-hour cruising speeds. No fuel-gulpers, they will permit 3,000-mile nonstop flights: across the U.S., Vancouver to Honolulu, London to Dakar.

Copyrighted material



De Havilland's new Mark IV is a larger, improved version of earlier Comets that enjoyed brief popularity on Europe-Africa-Asia runs. Their jet engines made them fast, smooth and quiet. But a series of tragic crashes that were later traced to metal fatigue grounded those original jet airliners.

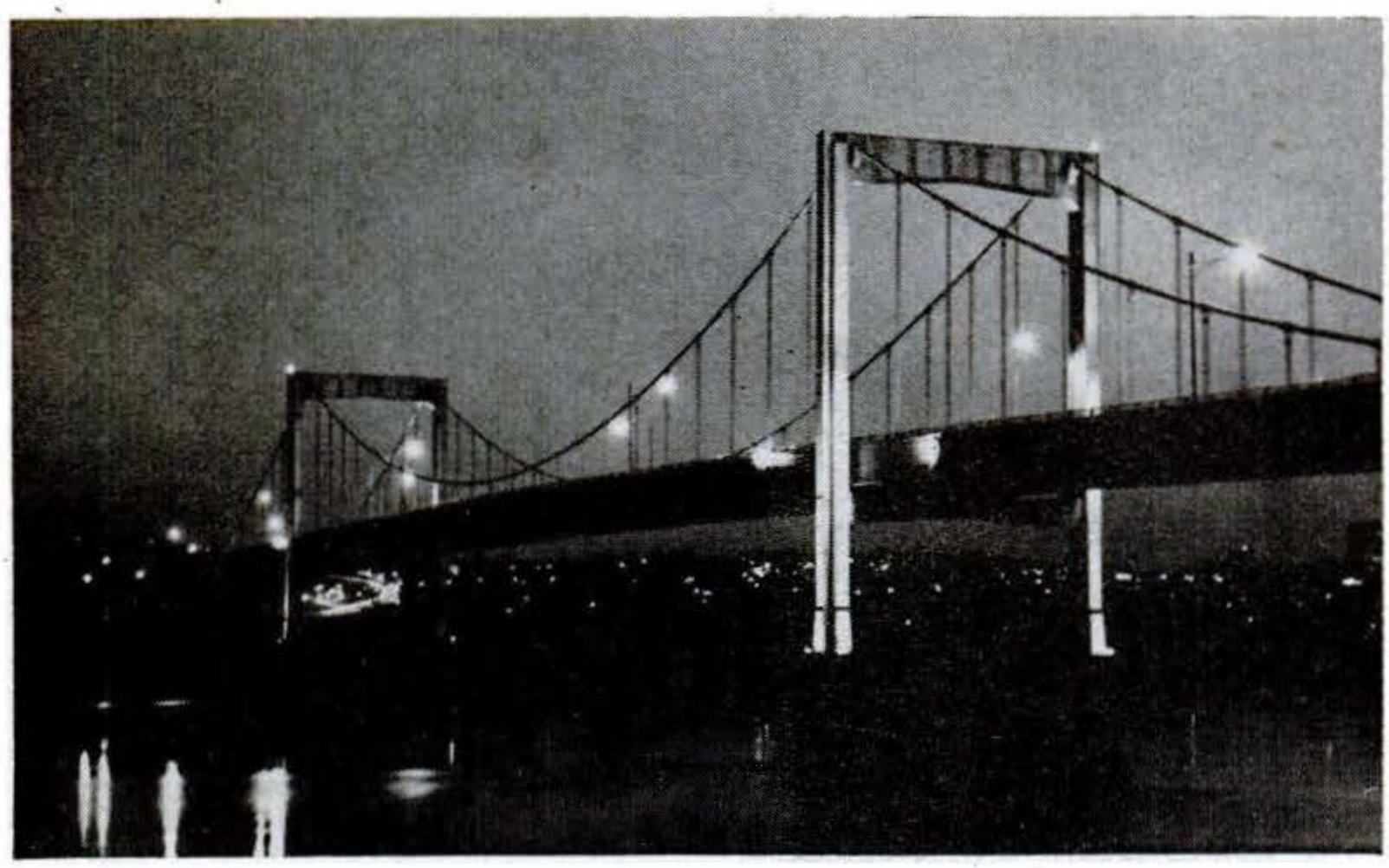
Now British hopes for leadership in civilian aircraft are tied to the Mark IV. Its builders expect it to be flying passengers before U.S.-made jet airliners—the Boeing 707 and Douglas DC-8—get into service in 1958-59.

Copyrighted material

New Solder May Cut Cost Of TV Tubes

A LOW-TEMPERATURE glass solder for sealing the face on color-TV picture tubes may make assembly quick and economical.

Elements are put in through the face, instead of the neck. The Owens-Illinois solder is then applied and the clamped face sealed on in an oven.



Missouri Bridge Named Year's Handsomest

HONORS for the most beautiful large steel bridge completed last year go to this Missouri River span at Kansas City, Mo.

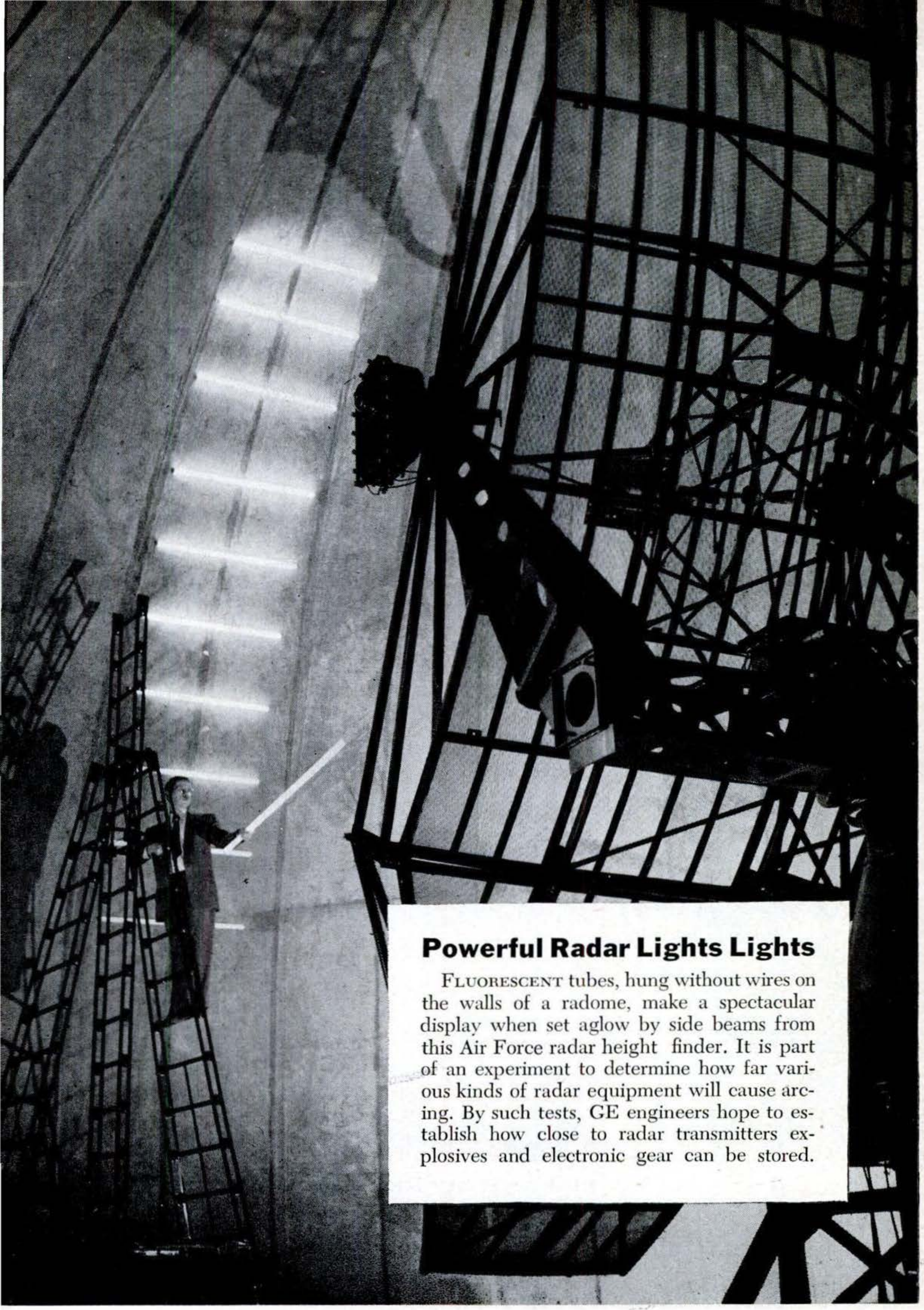
An American Institute of Steel Construction jury selected it both for design and for its economical use of materials.

Voice Powers Army Radio Transmitter

USING a single transistor and matched circuit, a new radio transmitter operates on energy generated by the sender's voice.

Inventor George Bryan, Signal Corps engineer at Fort Monmouth, N. J., is shown at left studying the oscilloscope wave pattern as he talks into a mouthpiece housing the transmitter. A companion receiver is now being developed.

Copyrighted material



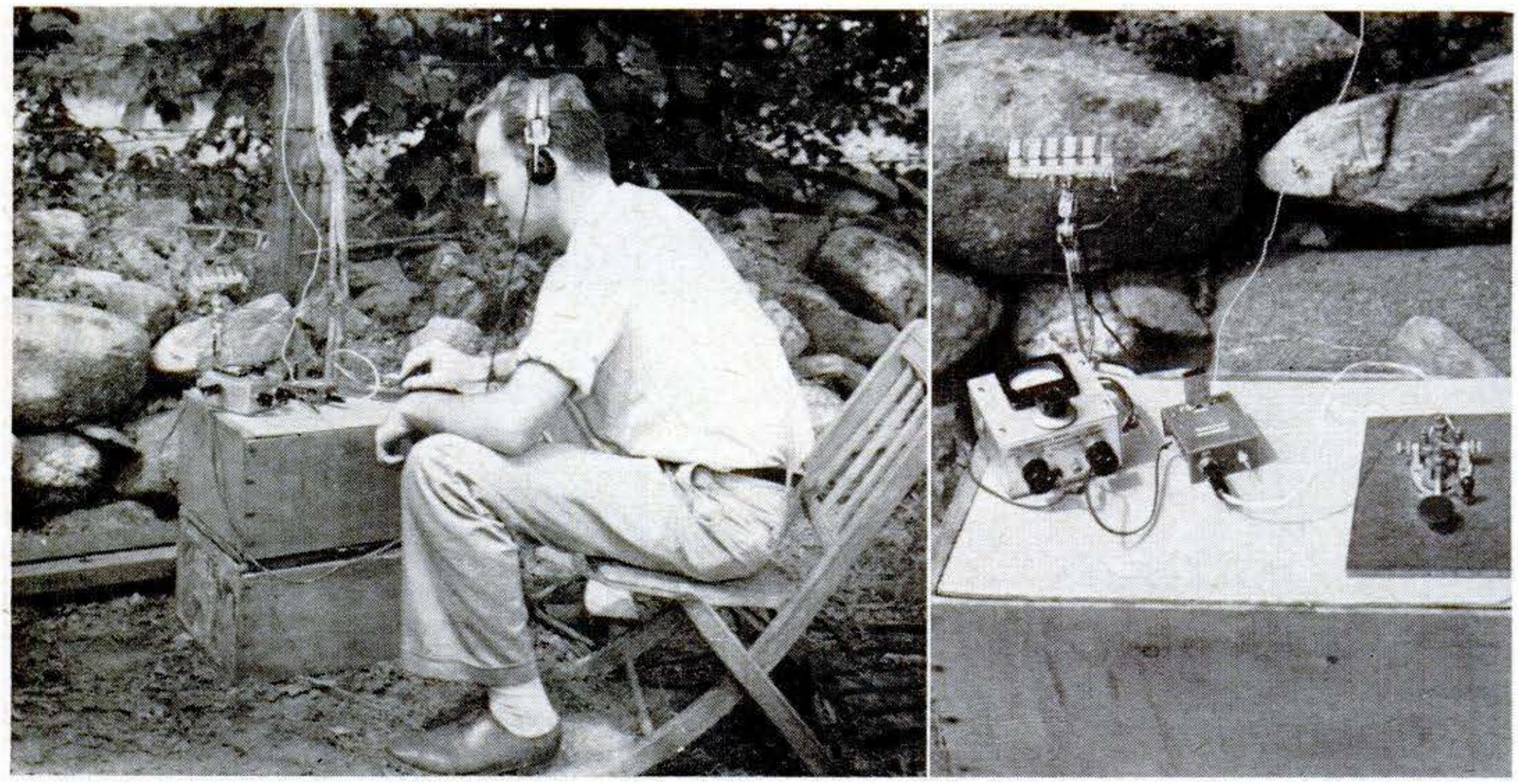
Powerful Radar Lights Lights

FLUORESCENT tubes, hung without wires on the walls of a radome, make a spectacular display when set aglow by side beams from this Air Force radar height finder. It is part of an experiment to determine how far various kinds of radar equipment will cause arcing. By such tests, GE engineers hope to establish how close to radar transmitters explosives and electronic gear can be stored.

Copyrighted material

Sunlight Trapped on a Telephone Pole Powers Rural Line

SUN ENERGY captured in 432 silicon disks, each the size of a quarter, powers an experimental circuit that serves eight Bell Telephone subscribers at Americus, Ga. Light striking the positive-negative junction on the disk surfaces sets up an electrostatic charge, which is drawn by wire from the plastic-enclosed solar battery. Excess current feeds into a storage battery lower down on the pole to supply subscribers with power at night.



Converted Solar Energy Puts Amateur Radio Station on the Air

UTILIZING the sun to operate a radio set that he perfected, E. Laird Campbell contacts two stations 200 feet away. An output of .0015 watt transmitted messages on a frequency of 1,814 kilocycles during a test by the American Radio Relay League at North Granby, Conn. In the close-up on the right, six self-generating photocells, mounted on a bracket to face the sun, power the receiver (left) and the transmitter (center).

Copyrighted material

New Ideas
FROM THE INVENTORS

1 Half-Hammock to Turn Chair into Lounge. Detachable canvas strips running from seat to seat might add a touch of comfort to bus, train, or even station-wagon travel. Attached to reclining seats, they'd let a rider sit or stretch out in legs-up position. Or, by releasing snap fasteners, he could lower the tape to sit erect.

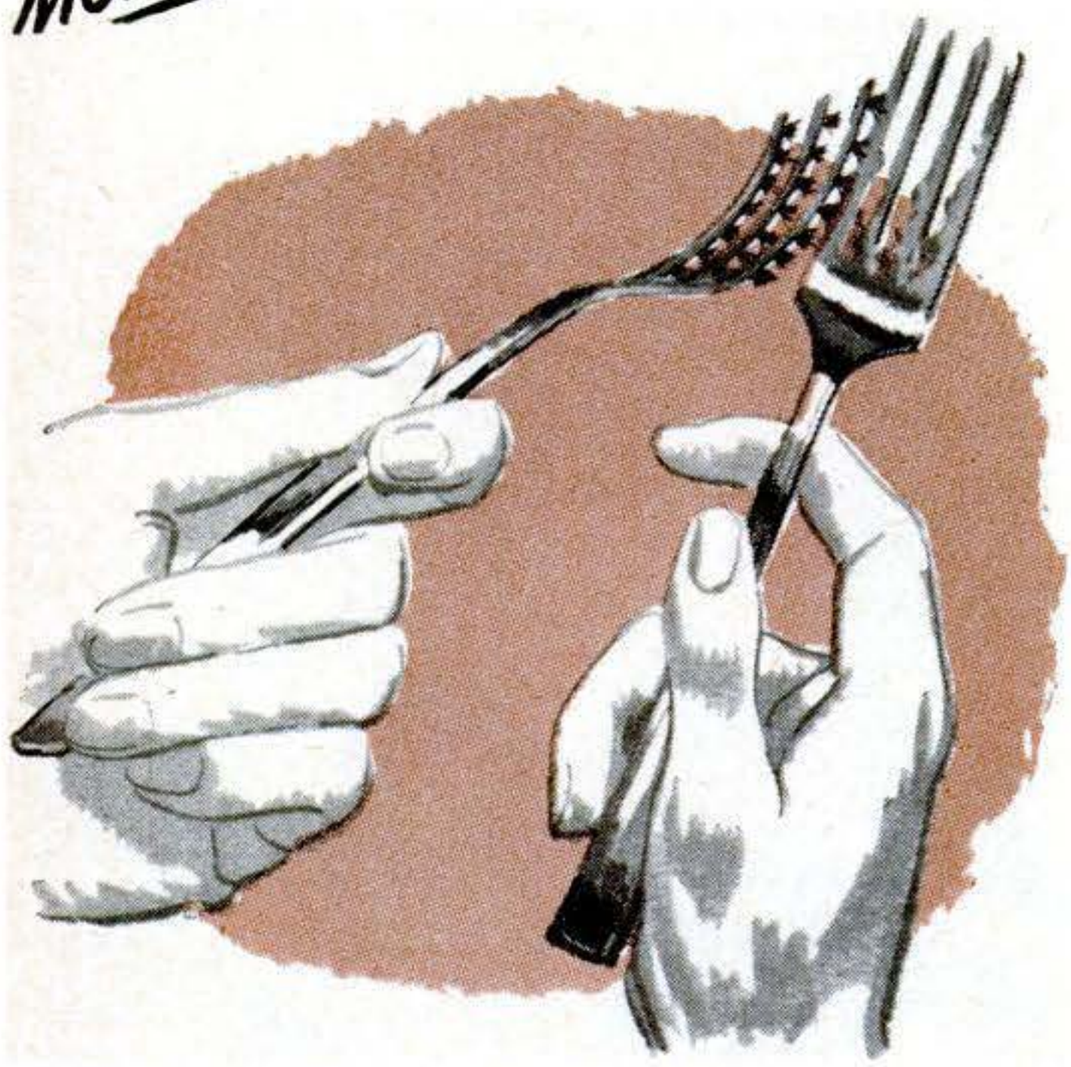
2 Spindle to Seat All Records. A retractable center for 45-r.p.m.'s would fit around the small spindle on this phonograph. Springs would lift the large center to receive 45's; weight of standard disk would lower it flush with turntable surface.

3 Dish to Reel In Soap. Soap wouldn't slide under foot or melt away so fast if it reeled into this wall holder. The cake would hook to the end of a spring-wound line; by tugging the line, you could catch or release the window-shade-type spring.

Please turn the page for more new ideas

Copyrighted material

MORE New Ideas from the Inventors



4 Fork to Clean Forks. Many dishwashing gadgets tend to skip over food particles that settle between the tines of a fork or cling to hard-to-reach surfaces between the tines and the base. The bristled clumps on this cleaning fork would dig into such missed places. The tool is designed to simplify polishing as well as cleaning.

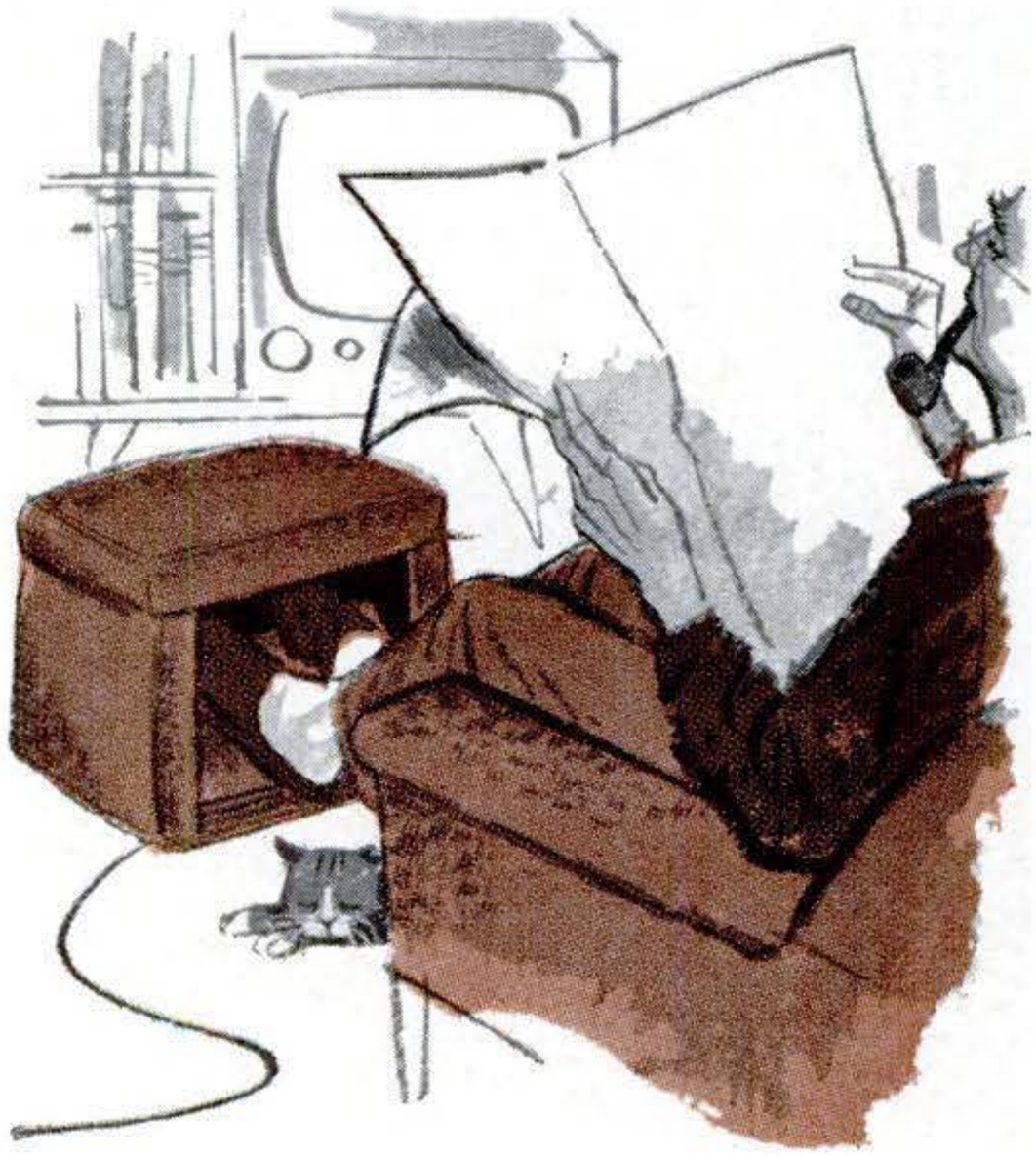
5 Lamp to Carry Its Own Socket. You could spot your Christmas-tree lights where they'd show up best with this GE-patented outfit. Bent prongs on each lamp base would fit into a channel on a matching two-conductor wire. One twist would drive the pins through the insulation, fasten the bulb in place, and make electrical contact.

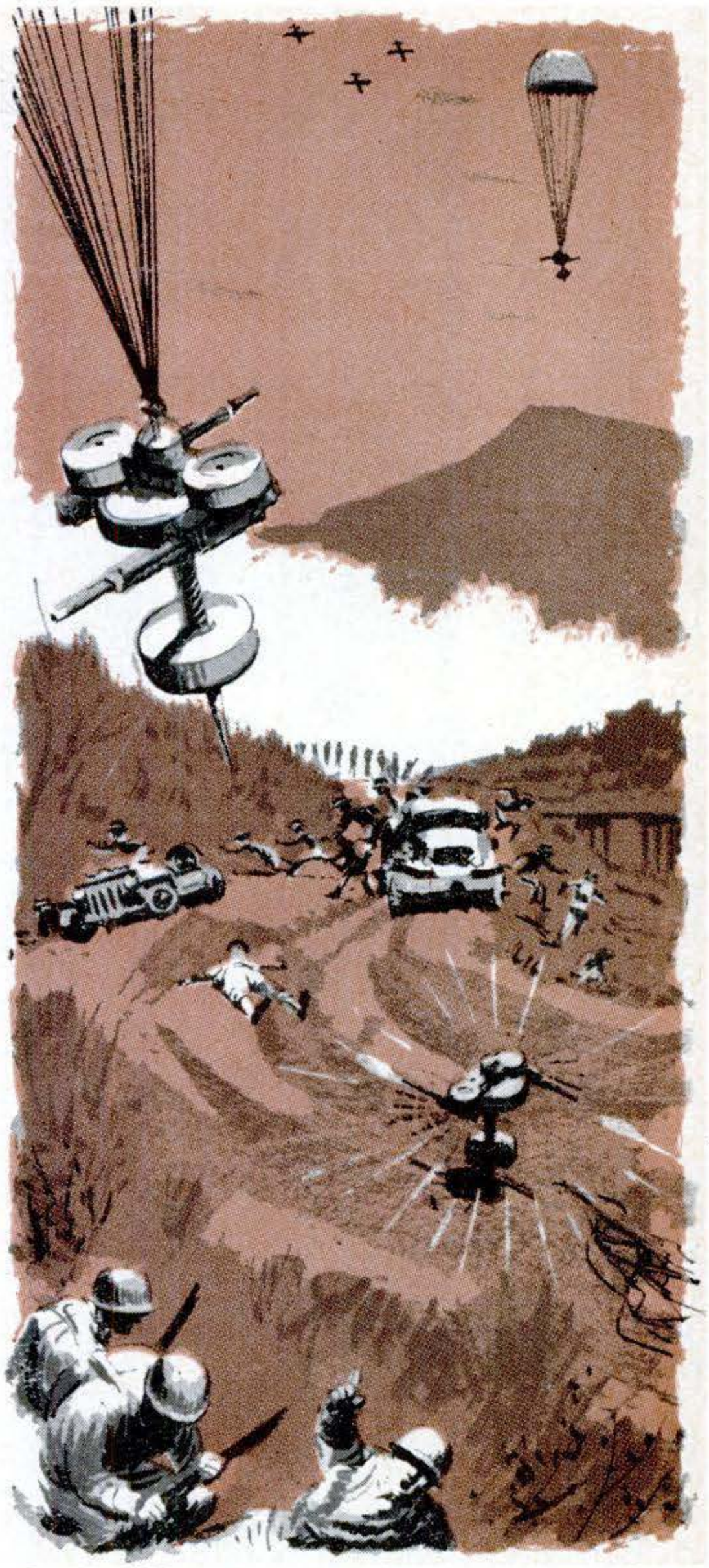
6 Tear-Off Grill to "Clean" Itself. Instead of scrubbing this cooking surface, you'd just pull a clean, new grill into position and tear off the soiled part. A roll of metal foil in a dispenser at the back of the stove would supply the renewable grill tops. The foil could be indented to form a grease receptacle. The cooking area would be surrounded by a hinged frame that would act as a guide for the foil and keep it taut. A sharp edge at the front of the frame would serve as a cutter for foil that had been used. The disposable grill could be heated by conventional gas or electric burners.

Copyrighted material

7 Heated Blade to Scrape Ice. Plugged into the cigarette-lighter socket, this electrically heated wiper would de-ice your automobile windshield by combined scraping and melting action. A heating coil just behind the replaceable metal blade would warm the scraping edge. Insulated packing would keep the handle cool.

8 Hassock to Warm Your Feet. You could rest your dogs on top of this hassock or warm them inside by pressing them against a hinged panel. Opening the door would turn on a heating unit. When you removed your feet, the door would spring shut and automatically turn off the juice.





9 Machine Gun to Fire Itself. By dropping spring-operated machine guns, planes could strafe a wide area without exposing themselves to ground fire. Landing impact would drive the mount's supporting spike into the earth and set off the firing mechanism. Paired guns, oppositely pointed, would revolve and wind downward on a threaded shaft. Reaching bottom, they'd trigger a self-destroying explosive charge.

U.S. patents on these inventions have been granted to: 1. Paul W. Erickson, Kansas City, Kan., and Mack H. Friedman, Kansas City, Mo.; 2. Norman L. Chalfin, NYC.; 3. Arthur E. Du Bois, Fort Lauderdale, Fla.; 4. Gordon E. Morton, Everett, Wash.; 5. Paul A. Carson, Pittsburgh; 6. John Hays Hammond Jr., Gloucester, Mass.; 7. James D. Clements, Richmond, Ind.; 8. Jack L. Hare, Los Angeles, and Kathryn E. Hare, Long Beach, Calif.; 9. Fay Hilliard, Houston, Tex.

Copyrighted material

Safety Fixtures Put More Light Into Coal Mines

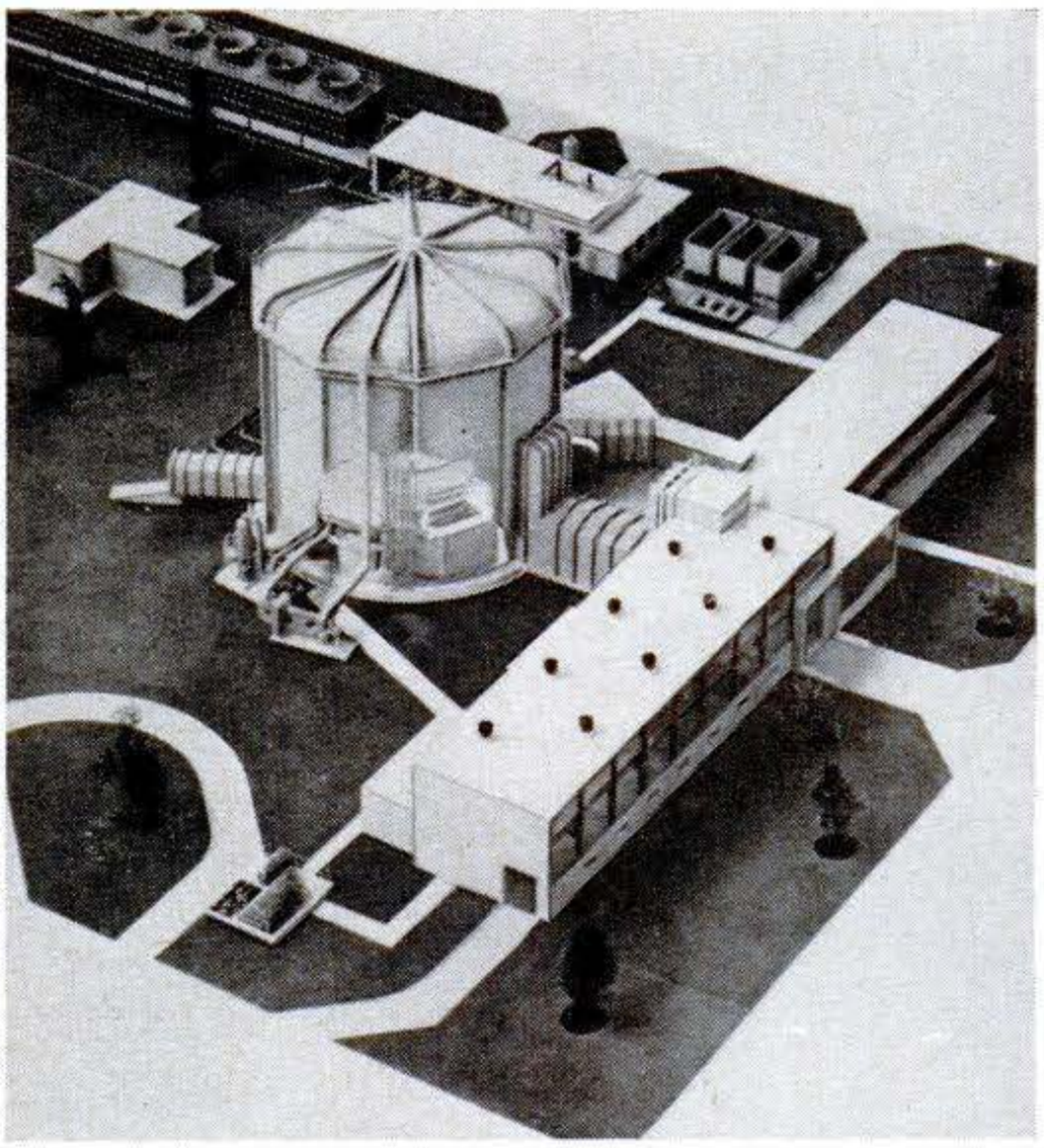
FLUORESCENT lamps, in firedamp-proof fixtures ironclad against sparking, now give Ruhr coal miners more working light.

In another type, compressed air rushing through the lamp casing clears out any explosive seepage before current enters as the tube is turned on.

And in Dutch mines, cold lamps having non-afterglow cathodes and no starters give eight times the light of incandescent systems. An explosion-proof plug-in base and adjustable sockets at both ends of the fixtures make lamp changing easy.

Farmer Strafes Mice from Air

THROUGH a furnace pipe over the side of his plane, Russell Sage bombs field mice with poison pellets. Prop blast through a venturi-tube setup forces bait, dropped at low altitude, to a crop's base. The Burt, N.Y., flying farmer seeds an acre in two minutes.



Britain Pushes Peaceful Atoms

"DIDO," a heavy-water reactor to be completed in Britain next year, is shown in the model above. With the highest neutron flux of any research reactor in Western Europe, it will help determine the pattern of Britain's future reactors for generating power.

Copyrighted material

Truck-Train Follows Leader Around Corners

ALL-WHEEL drive, plus automatic steering through mechanical couplings, guides each vehicle in this eight-truck train in the tracks of the one ahead, even on sharp turns. The operator in the forward truck steers the two front wheels by means of an electric control system.

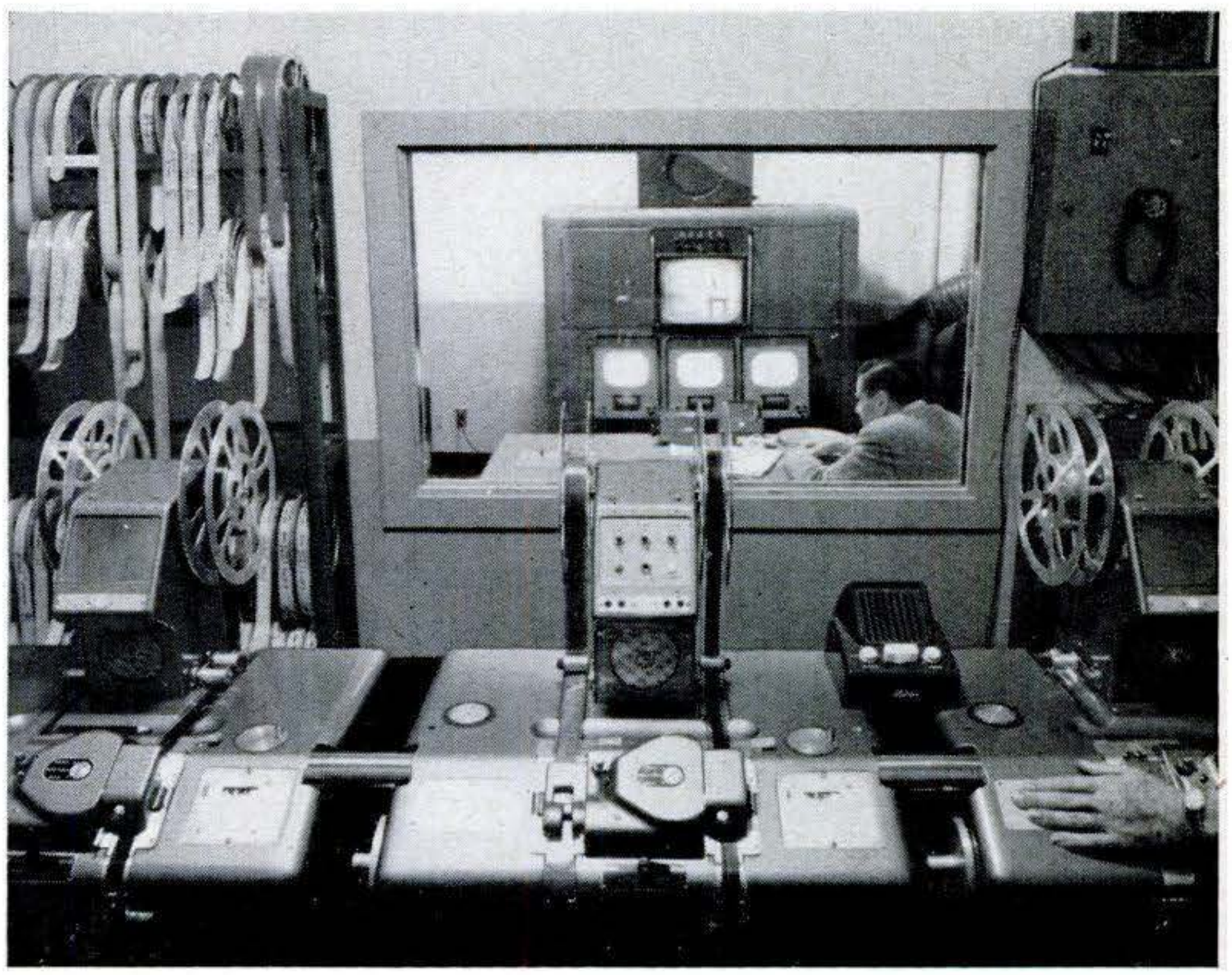
Power for the train, built by R. G. LeTourneau, Inc., of Longview, Tex., comes from a generating plant in one car, which supplies juice to a motor in each wheel of each of the trucks in the train.

Tires, as much as 10 feet high and four feet wide, and flexibly mounted axles, enable the train to travel off the highway over sand, snow, mud and rough ground.

Three Heads Better Than One For TV Editing

THIS "three-headed monster" is used by Disney Studios to save time and costs in editing TV shows.

Negative film, taken by three cameras, is run on the right-hand reels of each mount. An editor (visible through the glass window) can blow up scenes on a master screen from any of the monitors below it. A sound track is at left on the center unit.



Copyrighted material

Science Is Popular in Toyland Now

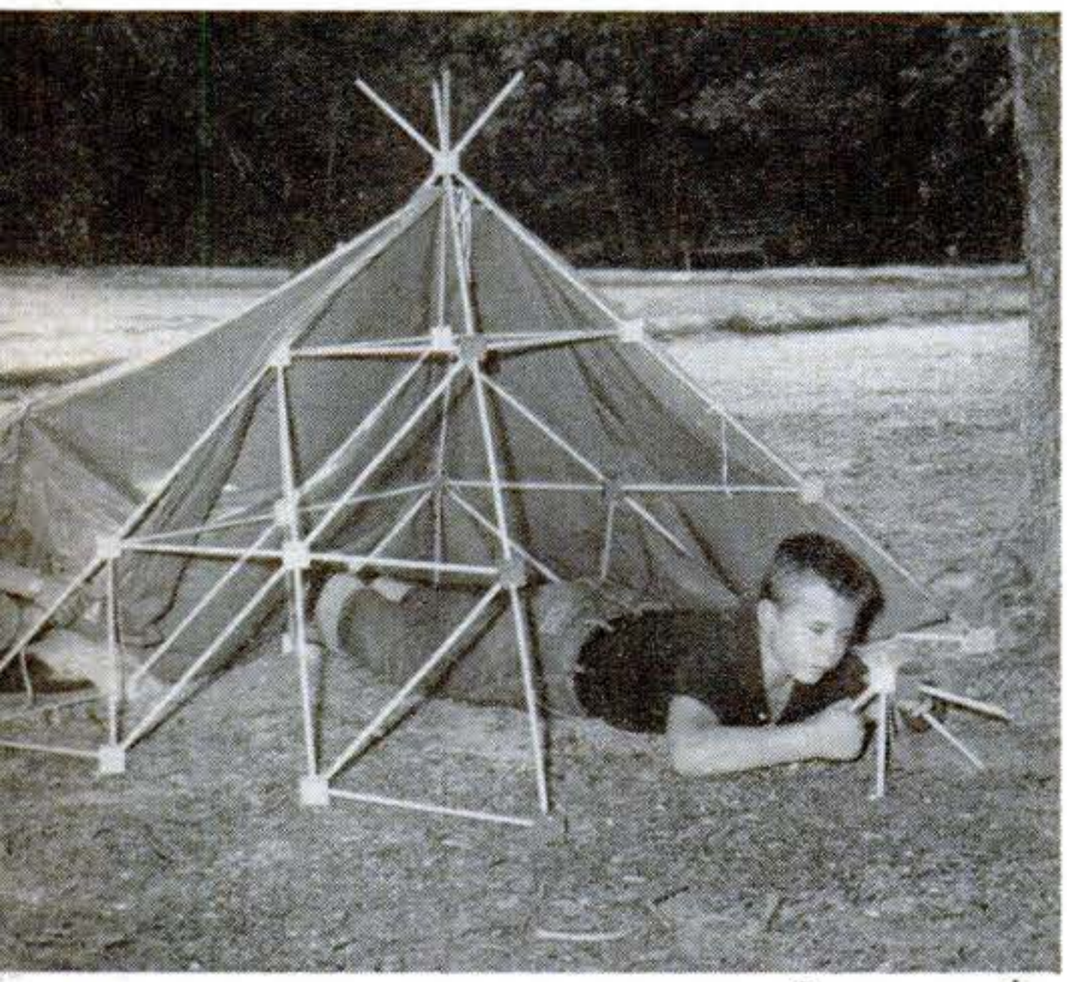
PHOTOS BY W.W. MORRIS

WHEN more than 50,000,000 pairs of excited small hands have torn the gay wrappings off their presents, on the last Sunday morning this month, there will be more science toys in action under America's Christmas trees than ever before. The reason is that this year's new toys are, as always, a child's reflection of the adult world.

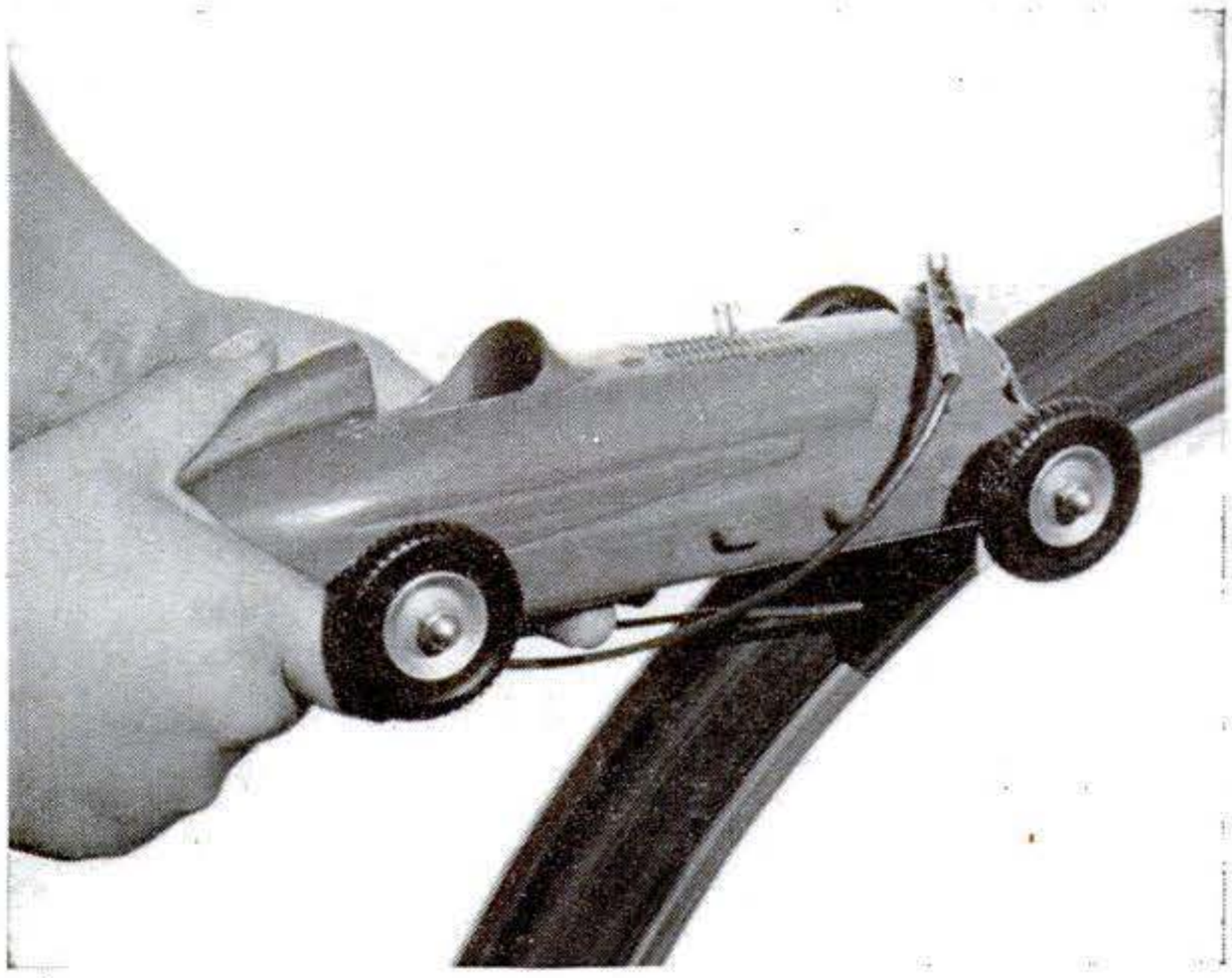
Toys have become a year-round business instead of a Christmas and birthday splurge, and sales will top the billion-dollar mark in 1955, says the Toy Guidance Council. The ones shown on these pages are among the most ingenious of the new crop. Among others are chemical sets with atomic-energy experiments, Geiger counters and a uranium-prospecting game.

1. Mobile Rocket Launcher. The plastic "birds" fired by this reproduction of a military missile launcher have a soft nose so that even a direct hit won't hurt furniture or walls. A ratchet gear raises and lowers the launcher realistically.

3. Building Blocks and Dowels. The blocks, or cubes, of Space Builder have holes into which dowels of varied lengths fit snugly. The youngsters below, using geometric patterns, have built the framework for a boy-size Indian tepee.



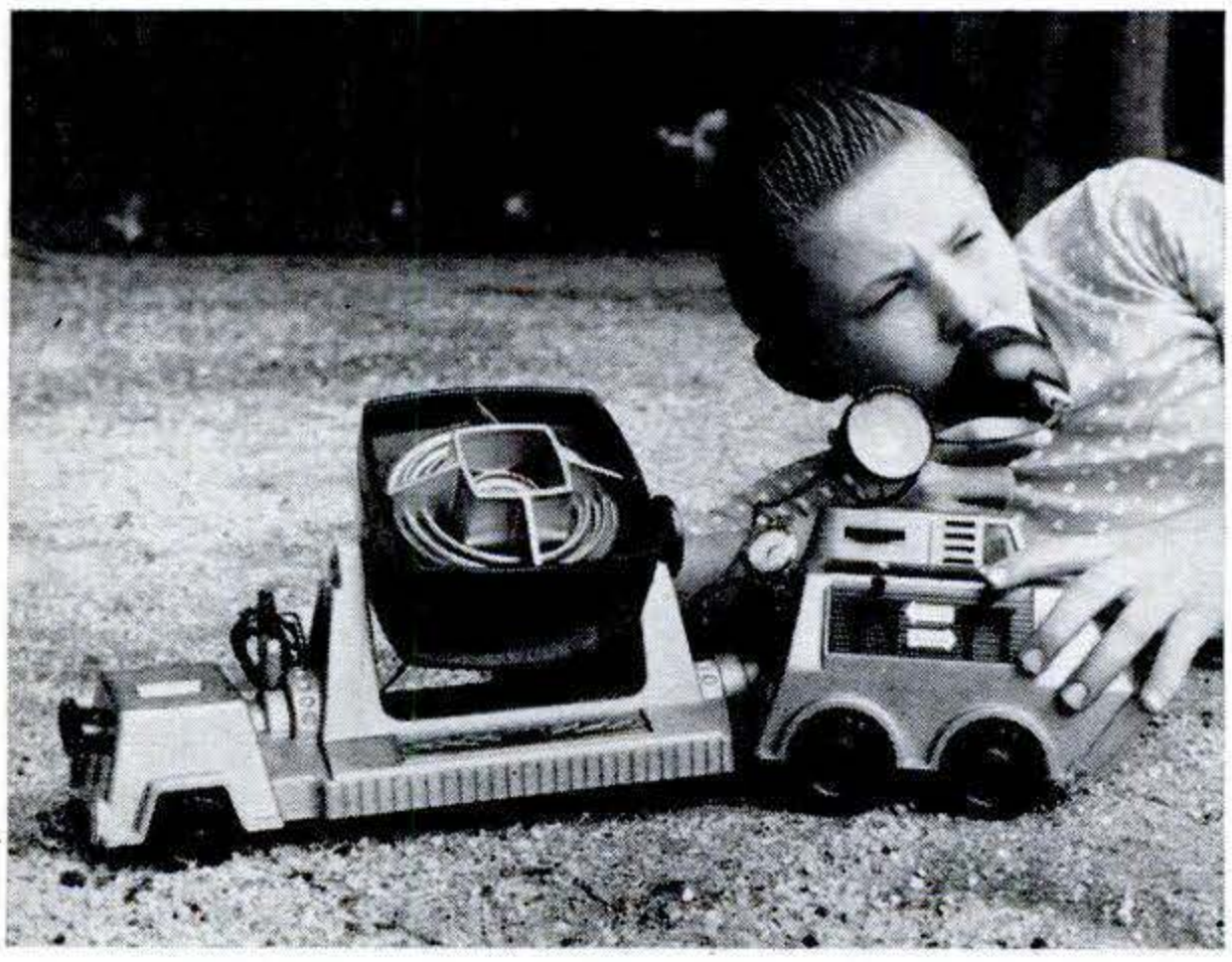
4. Racer with a Real Engine. A one-cylinder engine, weighing less than an ounce, powers the Automite race car. The engine has a cord-pull starter, but this lad does the job by holding one car wheel against a spinning bike wheel.



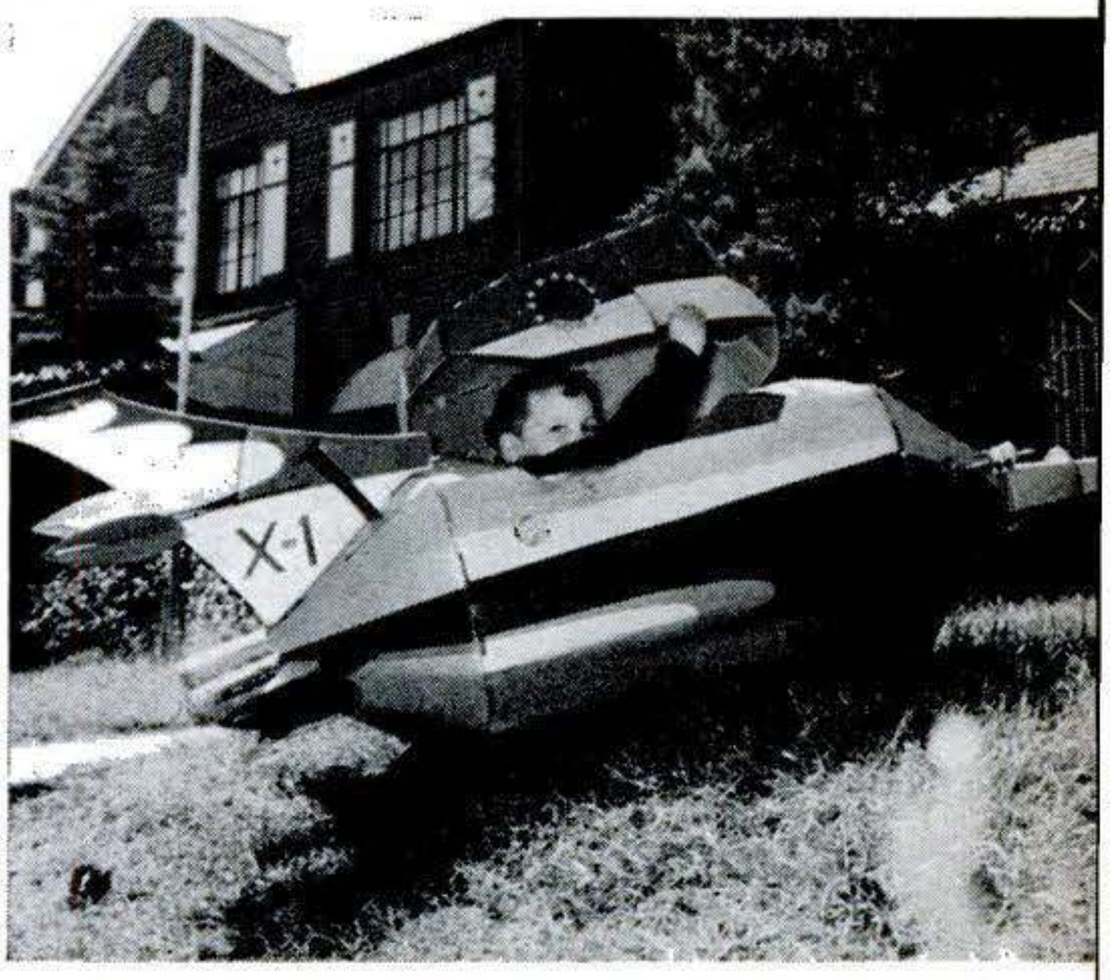
Copyrighted material

2. Remote-Control Flight Trainer. An electric motor spins the props (or helicopter rotor blades) of these aircraft. Once airborne, the plane's flight and maneuvers are manually controlled in climbs, dives, loops and landings. Props are flexible plastic.

5. Mobile Communications Center. This six-wheel tractor-trailer has a microphone and loudspeaker, a revolving searchlight that can be flashed on and off for signaling, and a buzzer system. Four batteries operate the equipment.



6. Spaceship Built for Two. Junior is waiting for his copilot before blasting off in this seven-foot, fiberboard rocket plane. The assemble-it-yourself ship has a hinged cockpit canopy and a complete make-believe "instrument" panel.



Please turn the page for more new toys

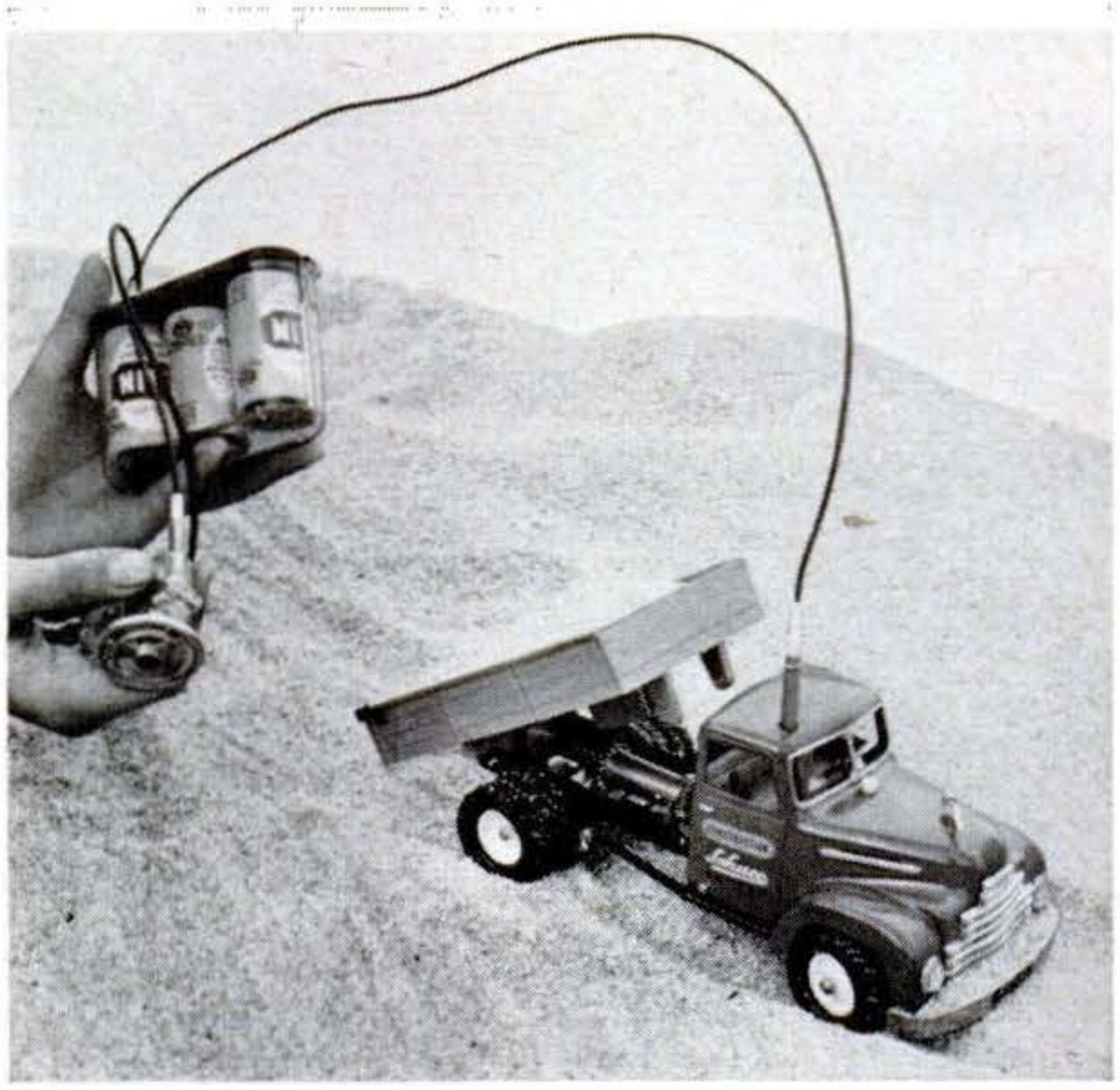
Copyrighted material

7. Outboard-Powered Speedboat. A kicker lifts this plastic Corvette Hydro hull right out of the water as it races either on a straightaway or in a circular course at the end of a control line. The 18-inch boat comes fully assembled.

8. Mechanized Sand Bucket. The two-level Aerial Sand Loader has a traveling cab with a clamshell shovel. Sand scooped up by the bucket is loaded into a movable hopper, which has a release for dumping it into the truck below.

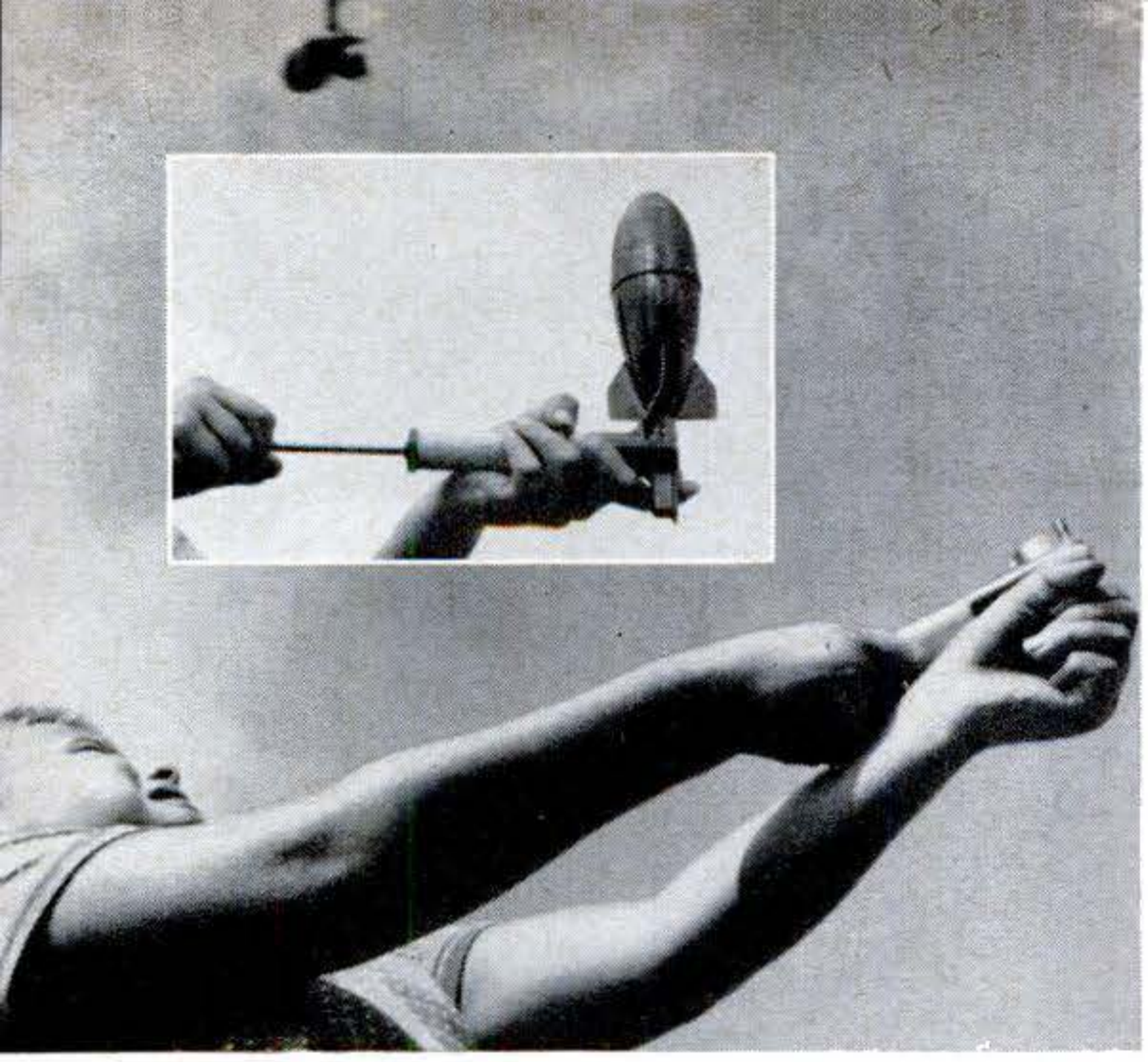
11. Air-Navigation School. A movable map of the world is the playing surface of Astron, an air-navigation game. Cards give each player flight instructions. Landings at an airport score points; hazards, such as storms, result in penalties.

12. Remote-Control Dump Truck. One hand-held control unit puts this work truck through its paces. Turning a gear wheel steers the truck as battery power drives the vehicle in two forward speeds or reverse. Horn and headlights work.



Most of these toys are generally available in toy and department stores. Following is a list of manufacturers or distributors, and approximate retail prices: 1. Ideal Toy Corp., 200 Fifth Ave., NYC ($3); 2. Marilyn Products, Inc., 8 Renee Place, Irvington, N.J. ($16); 3. Industrial Trends, Inc., 331 W. Washington Blvd., Chicago 6 ($4 to $9); 4. Wen-Mac Corp., 2240 Centinela Ave., Los Angeles 64 ($11); 5. Remco Industries, 113 N. 13 St., Newark, N.J. ($10); 6. Honor House

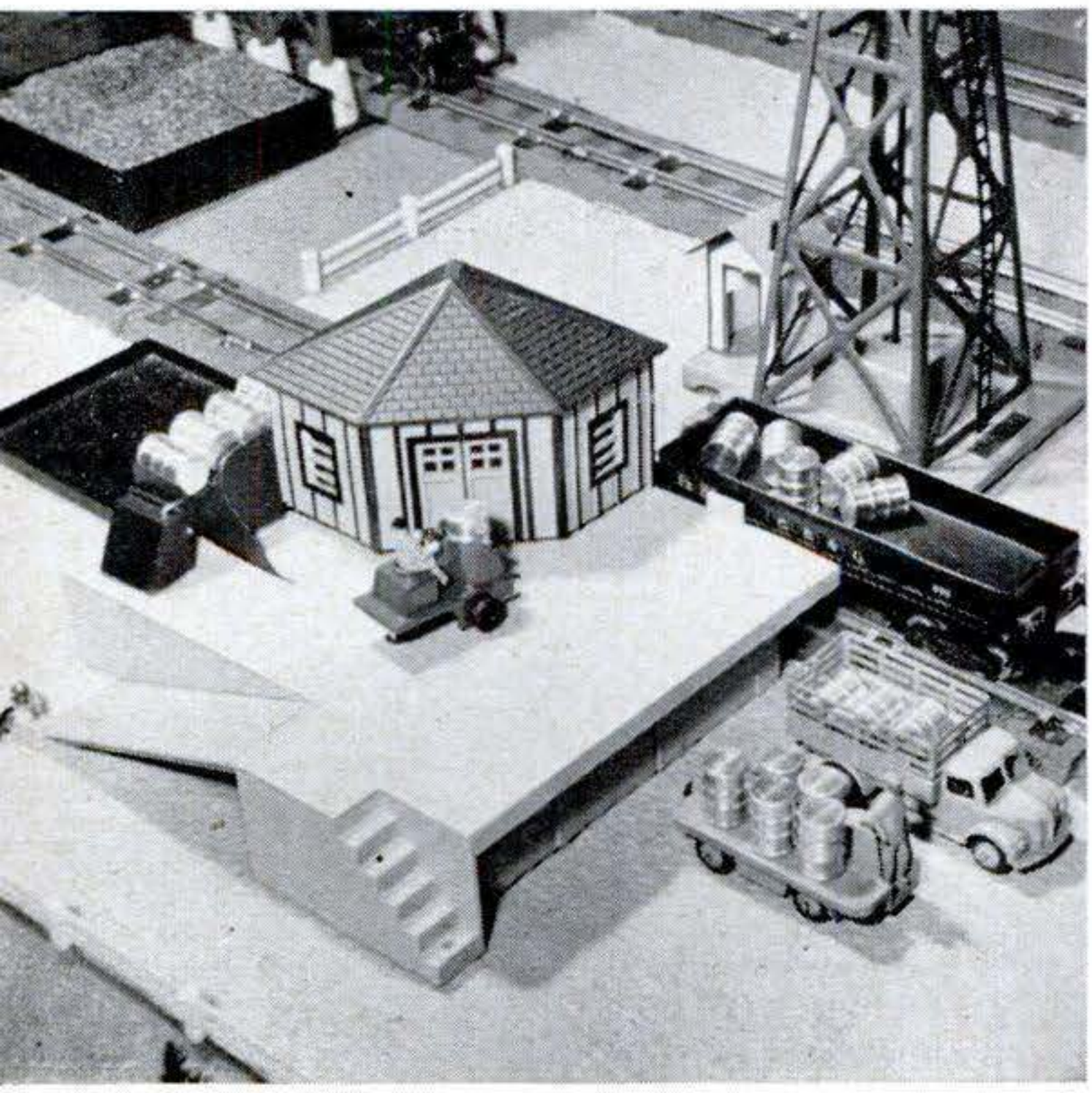
Copyrighted material



9. Jet-Propelled Rocket. For flights several hundred feet straight up, fill the eight-inch plastic rocket one-third full of water, pump in air (inset) and press a trigger. In flight, water ejected by compressed air makes a visible jet stream.

10. Table-Top Auto Trainer. In Driving School, a magnet moves tiny metal automobiles through streets, in and out of a garage and filling station, through a tunnel. Drivers can learn how to park, and practice safe-driving rules.

13. Electric Freight Handler. Press a button on this American Flyer accessory and Louie the Loader swings his fork-lift truck around to a ramp where he picks up an oil drum. Then he drives across the platform and dumps it.



14. Robot Driver. No, he won't hurt that table leg. When the tractor touches an obstacle, Marvelous Mike's arms and legs go into action as he shifts, backs up and goes forward again along another path. Batteries operate it.

Products, Lynbrook, N.Y. ($5); 7. Wen-Mac Corp., 2240 Centinela Ave., Los Angeles 64 ($13); 8. Mound Metalcraft, Inc., Mound, Minn. ($16); 9. Park Plastics, 940 Park Ave., Linden, N.J. ($2); 10. Mattel, Inc., 5432 W. 102 St., Los Angeles 45 ($5); 11. Parker Bros., Inc., Salem, Mass. ($3.50); 12. Schuco Toy Co., 44 E. 23 St., NYC 10 ($25); 13. A.C. Gilbert Co., Erector Square, New Haven 6, Conn. ($13); 14. Saunders-Swadar Toy Co., 500 Rathbone, Aurora, Ill. ($10).

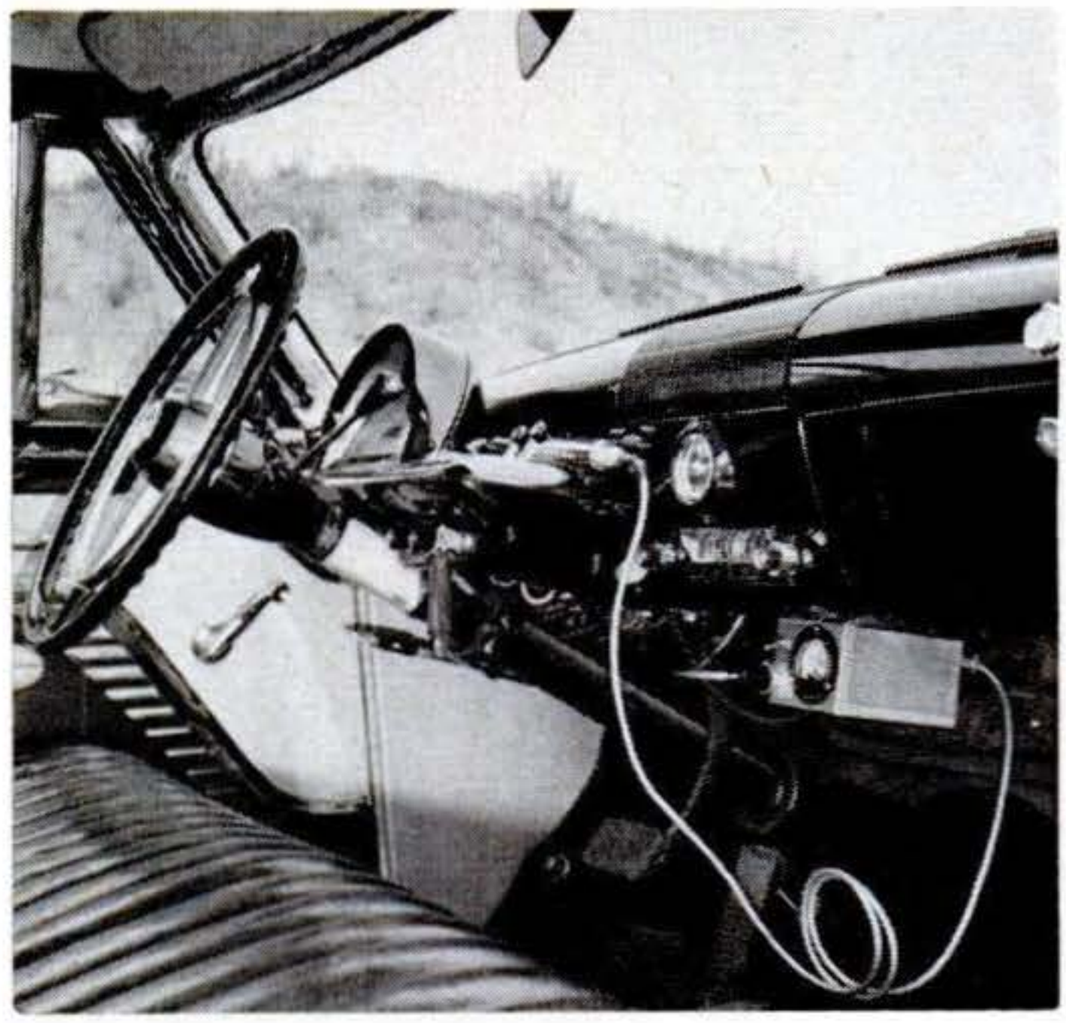
Copyrighted material

Walkie-Talkie Carhops Speed Service at Drive-in Restaurant

THE young lady in the photo (left) uses a lightweight walkie-talkie to call orders into the kitchen at Schilling's Drive-in Restaurant near Covington, Ky. The woman in the car thus gets her food faster. It's part of an electronic setup developed by Frank Lindley of Cincinnati. An operator at a receiver takes down orders from the walkie-talkie carhops. Then, when the food and check are ready, carhops are alerted by different-colored lights on signal boxes located so that they can be seen from anywhere in the parking area.

Two Engines Juice Up Dragster

WITH an Oldsmobile engine in front and a Cadillac in the rear, the "Bustle Bomb" (above) whooshed to a new drag-race record of 151 m.p.h. with driver Lloyd Scott. The Olds powers the car for the first 50 feet, then the Caddy cuts in. Reason: with 700 hp. between them, full power might cause excessive wheel spin at the start.



Geiger Counter Works in Car

YOU can hunt for uranium or detect radiation within a 50-foot radius while driving along in this car. Frank C. Strebe, University of California, fitted it with a detector that taps the car radio for power and sounds off with radiation clicks through its loudspeaker. The Geiger-Mueller tube and the other electronic parts used cost him about $30.

Copyrighted material

Automatic Drive Catches Up with Rockin' Chair

FELLER retired t'other day and got himself a new kind of rockin' chair. Rocks itself. Rocks him, too. Seems like when this feller, a machinist type, quit to take it easy, some other fellers he'd worked with said, "Well now! How about him havin' a chair that rocks automatic-like?" So they built it out of a one-cylinder gas engine and gears. Works, too. Noisy though. Feller's name is Frank Miller. Other fellers —them as built it—are Bill Nyman, Bob Connelly, Joe Wright and Bill Jacobus. Chair rocks itself and Frank in Huntington Station, N. Y.

Copyrighted material

FLYING BRAIN in these black boxes, occupying a total of 29 cubic feet, is about equal in complexity to 200 television sets. It includes a radar transmitter, antenna, receiver, computer, pilot's scope, and manual radar control. The photograph directly opposite shows the whole works jammed into an F94.

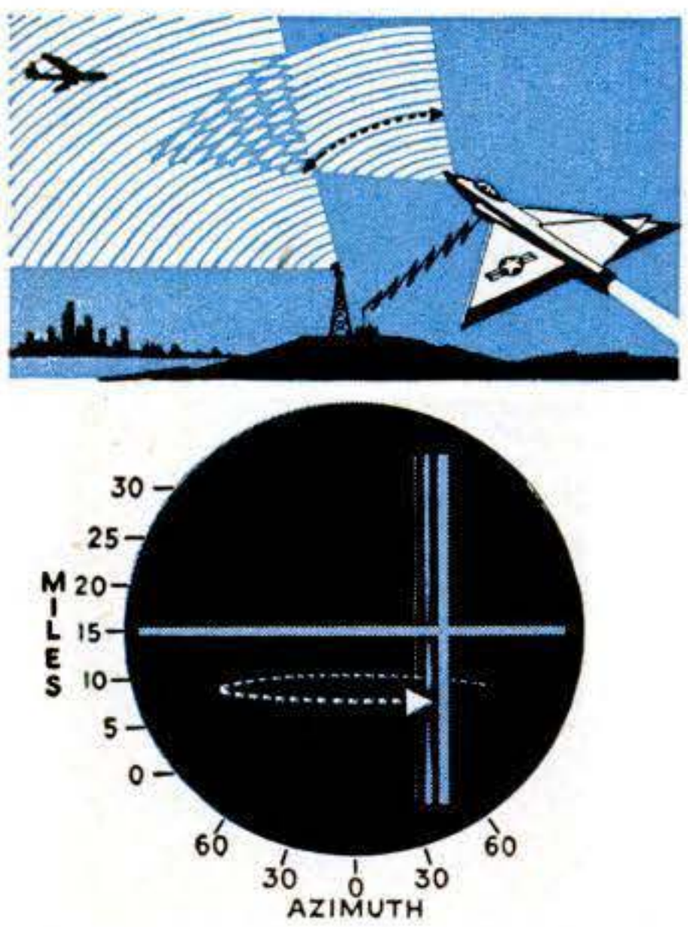
They Hit 'Em When

WHAT'S it like to attack an invisible bomber in a modern interceptor plane? The drawings below show all that the pilot needs to see. Above is the equipment that makes blind kills possible, replacing human responses with lightning-quick radar and computer reactions.

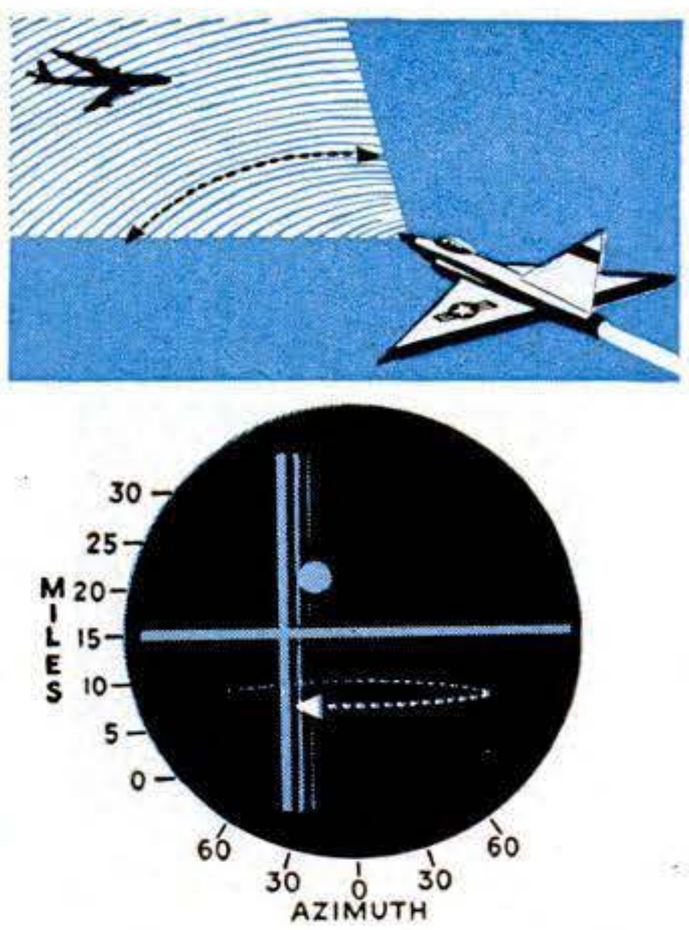
Every U.S. interceptor now carries the Hughes fire-control system, which "sees" by radar, computes course and firing data, and puts all the information that the pilot requires on a single radarscope.

Developed by the Hughes Aircraft Co., Culver City, Calif., the control system continuously shows the pilot how to fly a lead collision course despite evasion tactics. Seconds before the interceptor

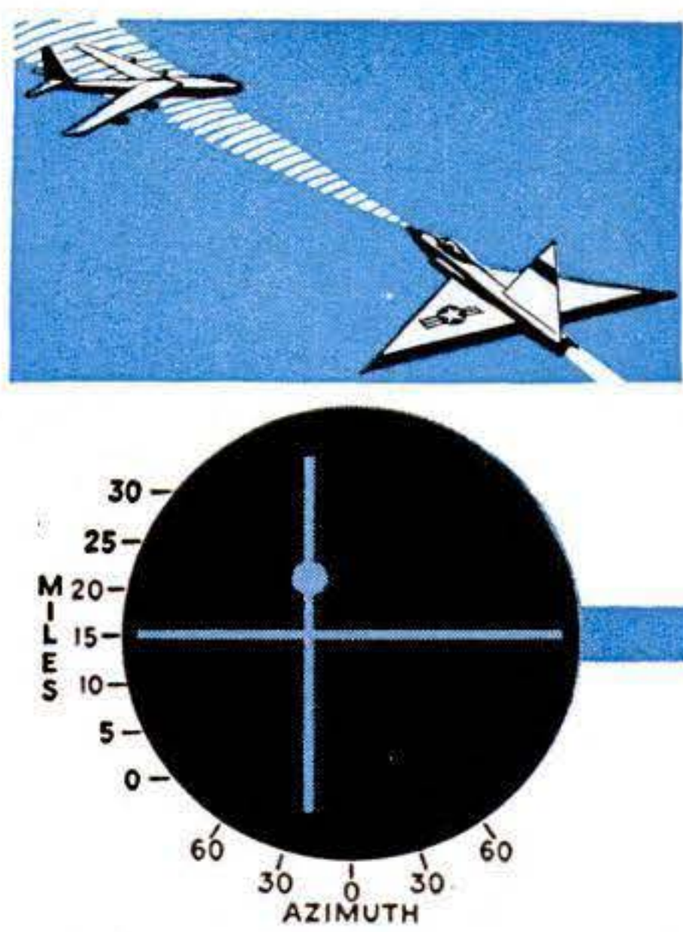
Fire-control system "sees" by radar, computes attack



GROUND RADAR guides interceptor to target area. Pilot's scope shows a vertical line sweeping from side to side, covering radar arc of 120°. Horizontal line (artificial horizon) shows plane's attitude.

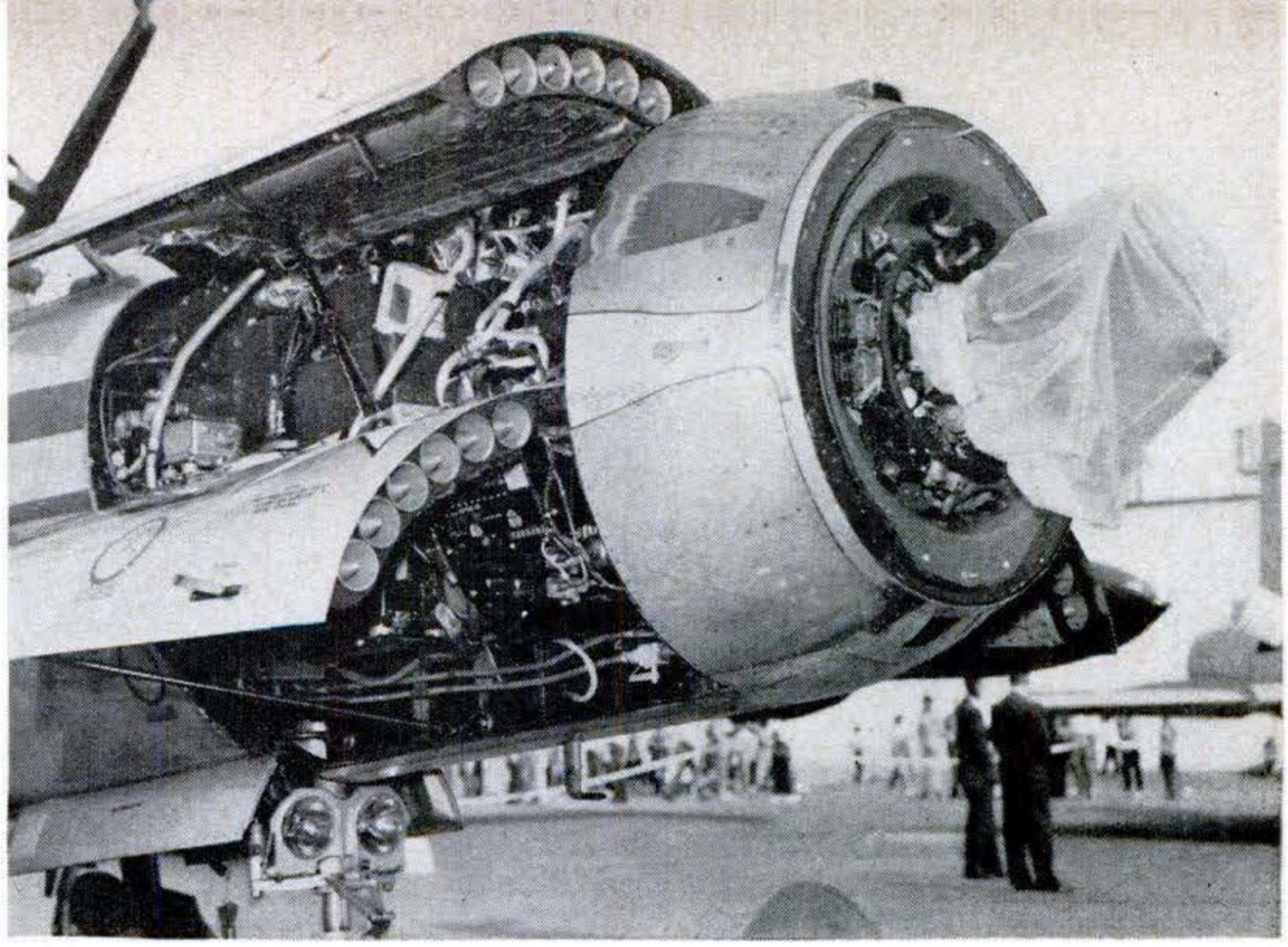


IN RADAR RANGE, sweep line on pilot's scope shows a bright blip. Scale at left gives the distance, azimuth reading the angular position of target from interceptor. Here it is 15° to port and 20 miles away.



USING HAND CONTROL, pilot can move antenna (as shown by sweep line) to spotlight bomber in his radar beam. He then presses the lock-on button. Beam follows target automatically, as image changes.

Copyrighted material



NOSE THAT KNOWS. Antenna, here wrapped up to conceal the features that are still secret, automatically sweeps from side to side over a 120° arc. This sweep shows on scope as a vertical line moving back and forth (see drawing at left below). Pilot can stop it on his target when contact is made.

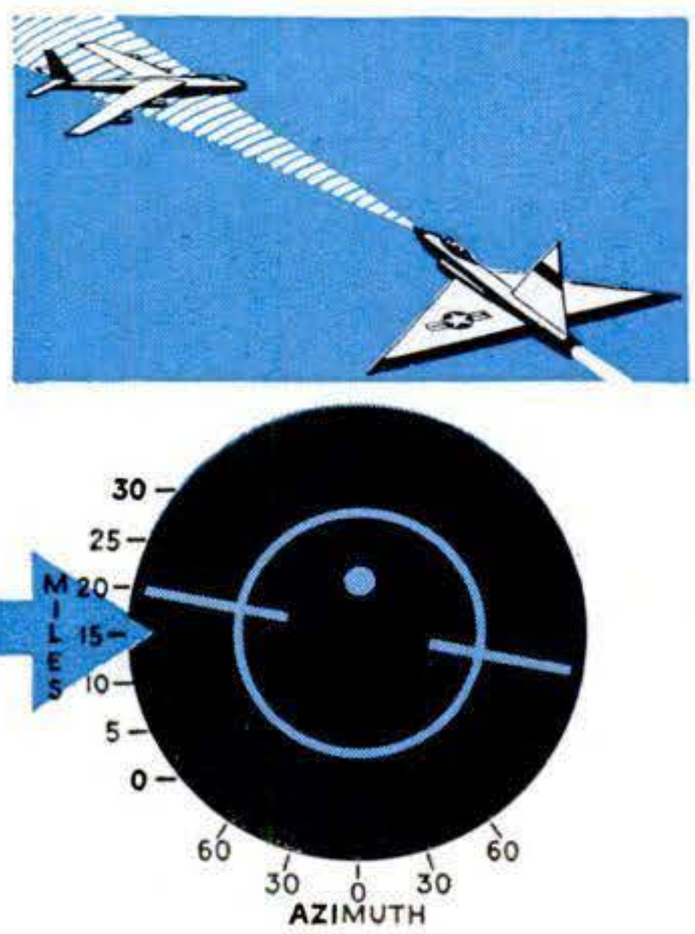
They Can't See 'Em

reaches firing position, the scope image tightens up its flight path. The computer fires the rockets at just the right instant.

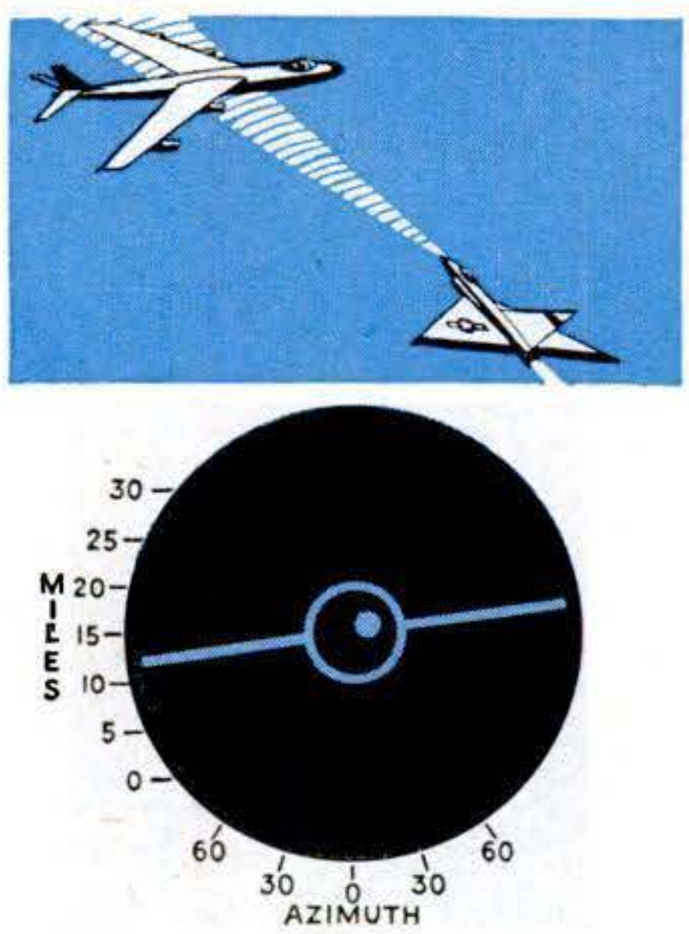
A further development, control-system tie-in, actually flies the plane from the moment the pilot locks on to his target until the attack is over.

Similar control systems will guide the firing of the Hughes Falcon (PSM, May '55, p. 127). Having a brain of its own, it can be launched much farther from its target than can rockets. At supersonic speed it can reach its target long before the launching plane could. Self-contained radar and computer equipment, so miniaturized as to be equivalent to compressing two TV sets into a football, guide it to its kill.—*Harry Walton.*

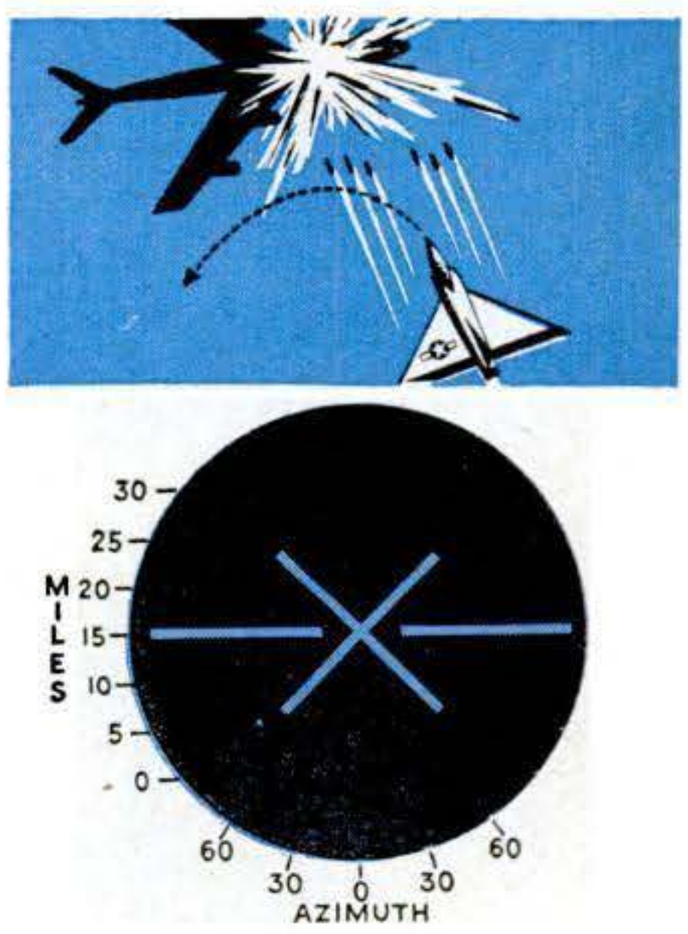
course and firing data, and puts it all on the pilot's scope.



NEW IMAGE on scope replaces sweep line with circle, target blip with steering dot. Pilot must "fly the dot"—center it in the circle. Computer plots data to bring the interceptor on a lead collision course.



WITH 20 SECONDS to go, the steering dot suddenly shrinks, forcing pilot to fly more precisely. The artificial horizon shows tilt of interceptor's wings. At 4½-second mark, the circle changes to a bar.



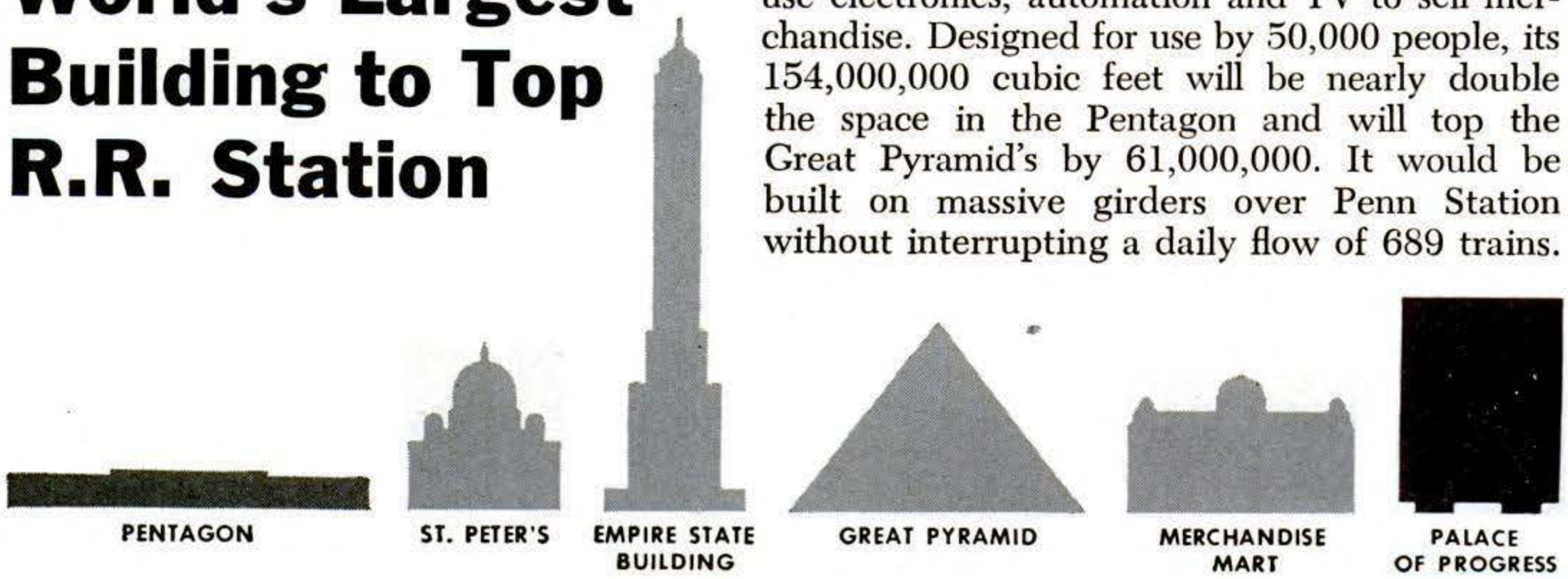
PILOT HAS SECONDS to level off for actual attack, aided by bar on scope. As rockets are launched by fire control, scope image changes to a cross to show attack is over, then returns to normal search.

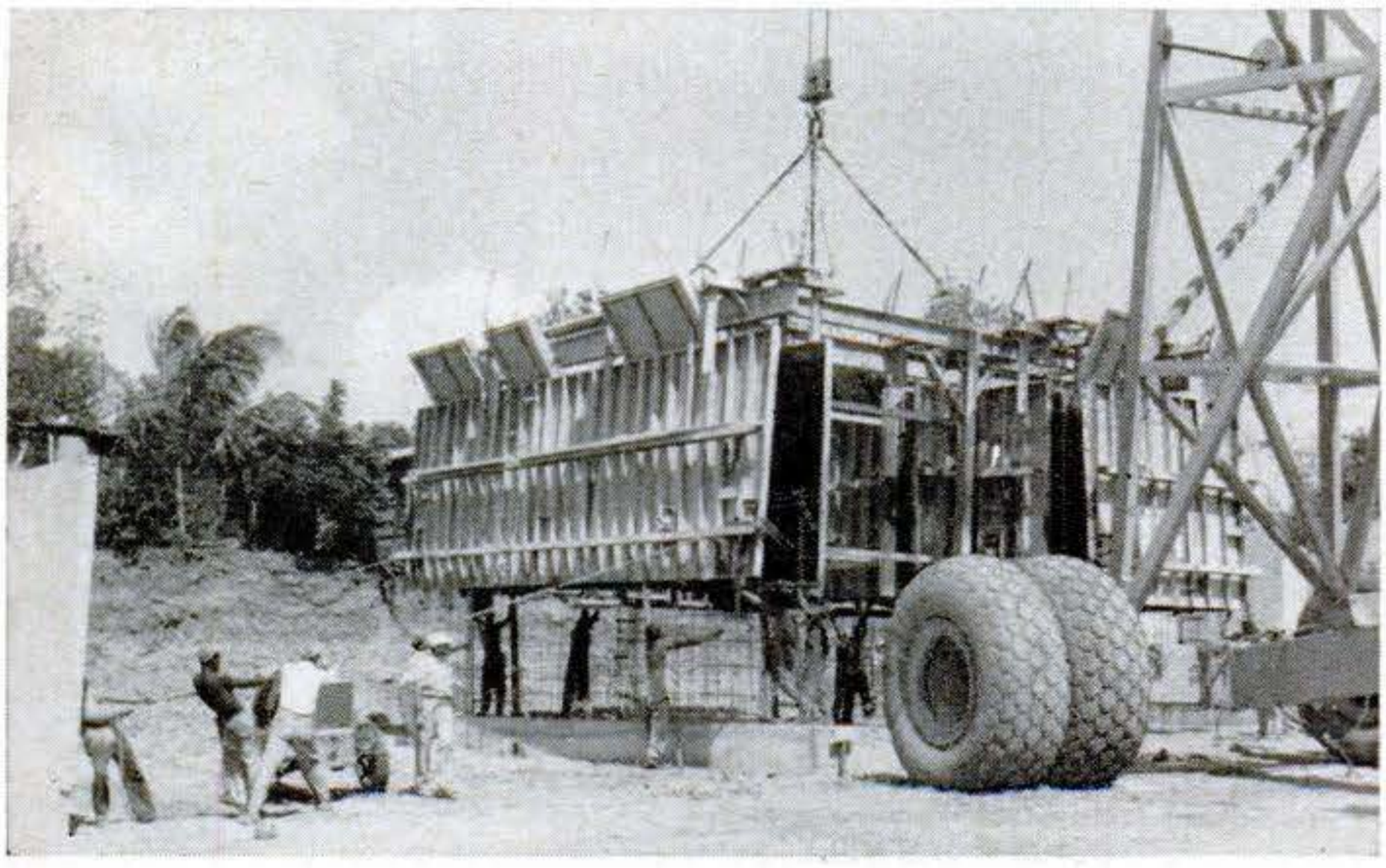
Copyrighted material

Giant curved TV screens surrounding one huge hall will picture world-wide news events.

World's Largest Building to Top R.R. Station

NEW YORK'S proposed Palace of Progress, planned for permanent industrial exhibits, will use electronics, automation and TV to sell merchandise. Designed for use by 50,000 people, its 154,000,000 cubic feet will be nearly double the space in the Pentagon and will top the Great Pyramid's by 61,000,000. It would be built on massive girders over Penn Station without interrupting a daily flow of 689 trains.



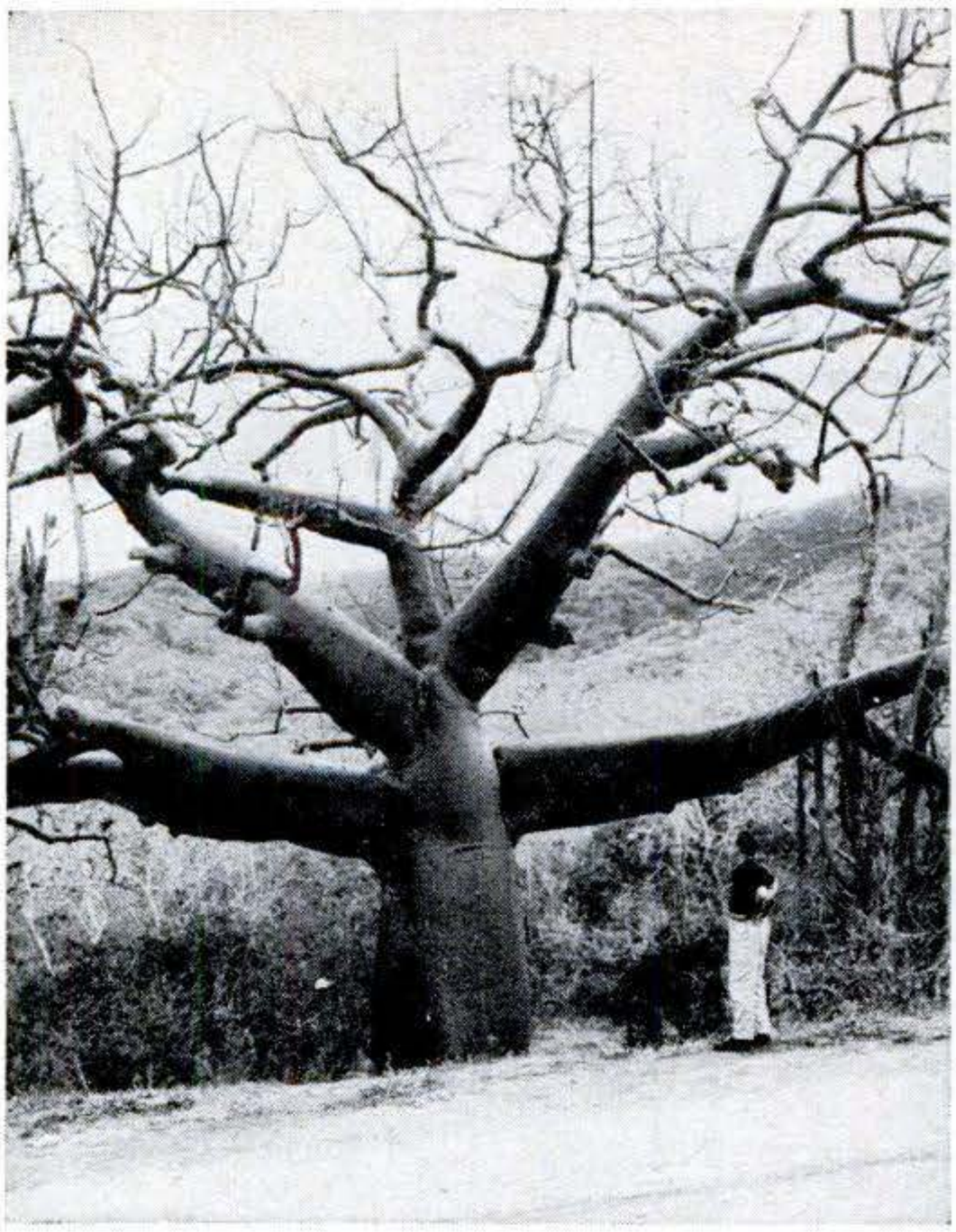


Portable Wall Forms Speed Home Building

ONE-PIECE steel forms, moved from site to site on a huge derrick, are being used to put up six homes a day in an all-concrete, 1,625-house project in Puerto Rico.

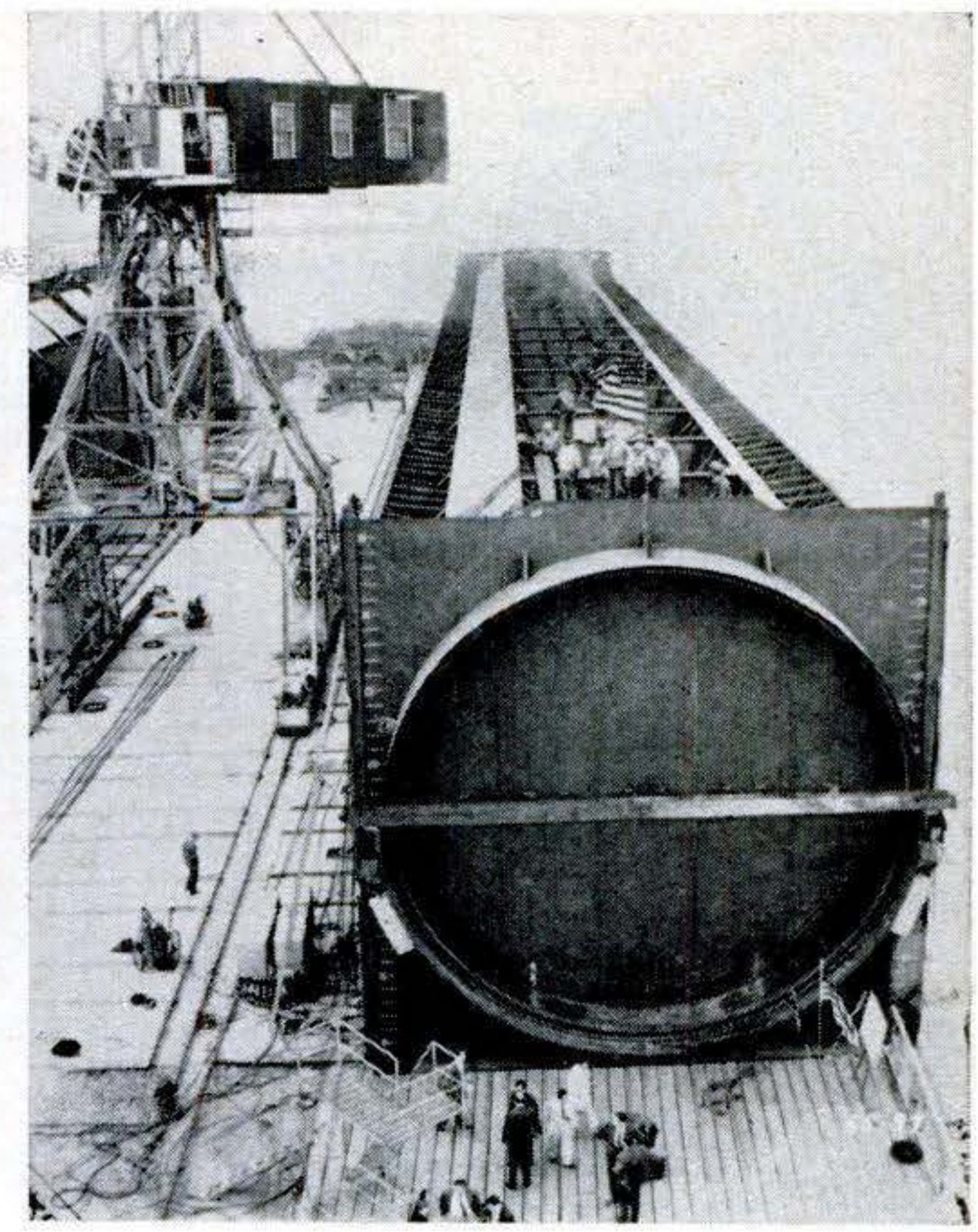
Outer and inner walls are poured in one operation after a floor slab is laid, wiring and plumbing installed, and reinforcing rods set in. A slab roof tops the three-bedroom home.

Copyrighted material



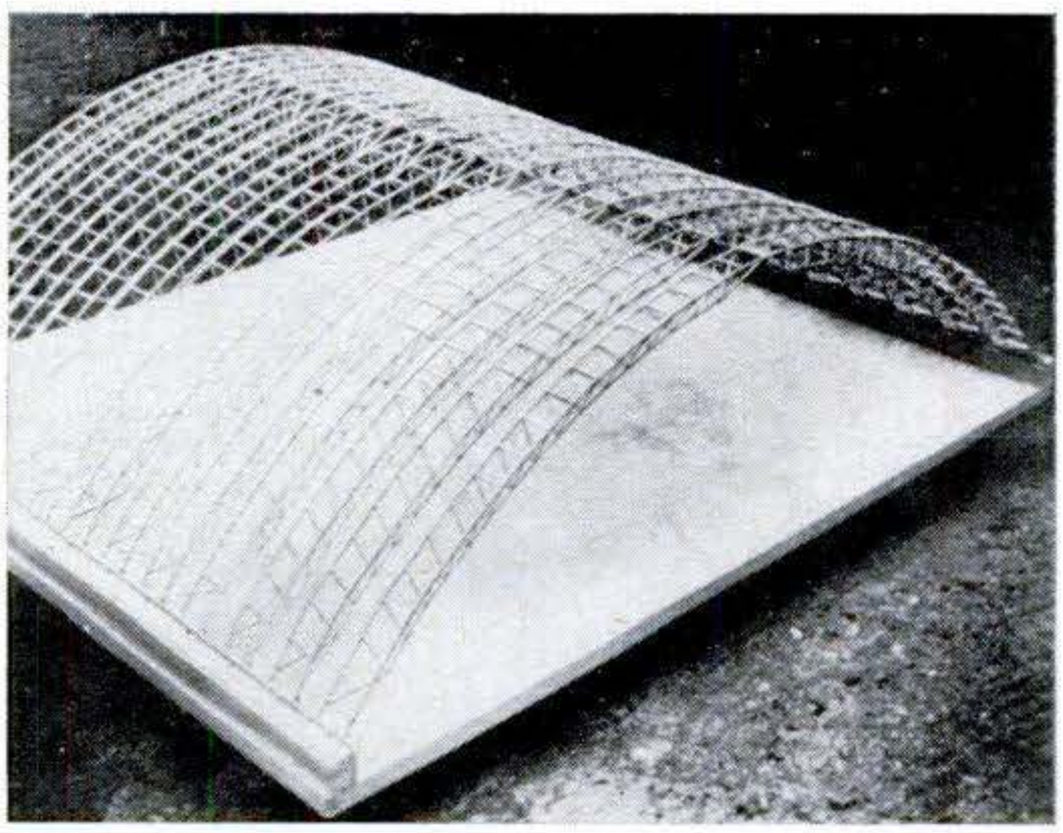
Kapok Harvesting, Anyone?

KAPOK trees like this one are going begging in the wilds of Ecuador. The Ministry of Economy has opened large tracts of land and is soliciting pioneers to develop the trees. There's little of a kapok that can't be converted—from the bark to the cottonlike hair on the fruit, which is used in clothes and as stuffing for pillows and life preservers.



Huge Tunnel Floats to Site

IT'S launching day on the Delaware for this huge section of a steel tunnel. With 22 others, it will be towed south to form a vehicular tunnel under Hampton Roads, Va. Concrete partly filling the double walls of the 300-foot casings will act as ballast on the two-day river-canal journey from Baldwin Locomotive's Philadelphia plant.



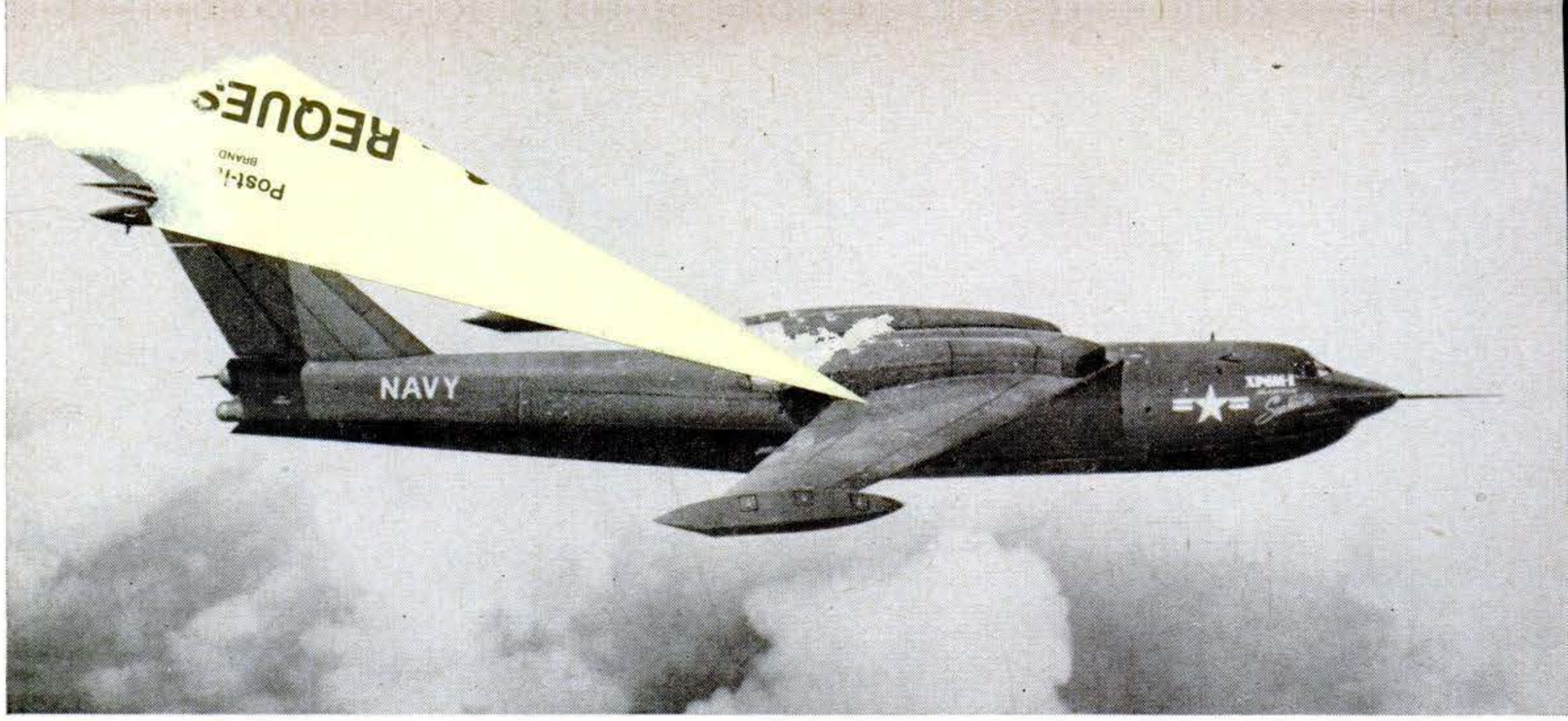
Prefab Would Seat 100,000

HERE'S a model of a $17,000,000 prefab, a huge convention hall proposed for Chicago. Plans call for a structure 1,000 feet long and 600 feet wide, with a ceiling that sweeps up to 150 feet at the top of its arch. The main floor would seat 75,000 and an air-conditioned gallery 25,000 more.

Post Office Gives Superservice

THIS motorist mails her parcels, without leaving her car, at a drive-in window in a new Palo Alto, Calif., post-office annex. In fair weather stamps can be bought, mail received or deposited through an open Dutch door. Voice ports and a slide-through drawer help when windows are closed.

Copyrighted material



WORLD'S FIRST multi-jet seaplane, hailed by the author as the shape of things to come in airliners, is this Martin SeaMaster, now being flight-tested for the Navy as a bomber.

5,000,000-mile pilot tells why

We'll Soon Ride Jet Flying Boats

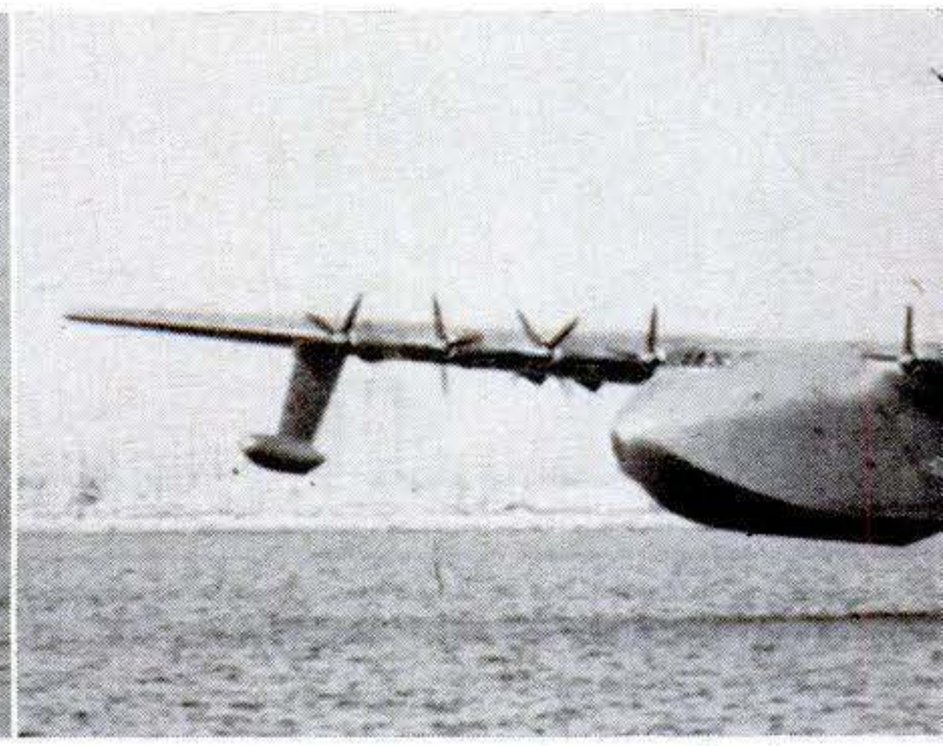
By Byron Moore From his book, *The First Five Million Miles*, published by Harper & Brothers, New York

THE AUTHOR: Byron Moore, a senior pilot for American Airlines, began his flying career as a barnstormer in 1926. He also has been a Navy, Army and test pilot. Next? "As I see it," he says, "it's a race between my retirement and the advent of jet transports."

AS OUR DC-7 neared New York's Idlewild Airport on a recent flight, Air Traffic Control informed us that the weather was marginal and that we could expect a delay of 35 minutes before being cleared to land.

We'd have two hours and 15 minutes of fuel to play with. We could hang around Idlewild in the holding stack for 44 minutes, if need be; then proceed to

IN SERVICE: Convair Tradewind is the Navy's most modern flying-boat transport now. Turbine-driven propellers give this plane a speed of 350 m.p.h., compared to a pure jet's 600.



IN DISCARD: Howard Hughes' "wooden monster," as the author calls it, never got higher off the

Copyrighted material

IF REDESIGNED to carry passengers, the author says, the four-jet SeaMaster, cruising at 600 miles an hour 40,000 feet up, could cut transcontinental airline time nearly in half.

Boston, where the weather was good, and land with our 45 minutes' legal reserve of fuel.

We decided to make a try for Idlewild —and managed to squeeze in.

Had we been flying a jet that night, we couldn't have even attempted a landing at Idlewild. Along about Columbus, Ohio, we'd have changed our destination to Washington or Boston, or wherever the weather was good. Then we would either have put the disgruntled passengers on the train or on a piston-engine plane to complete their journey.

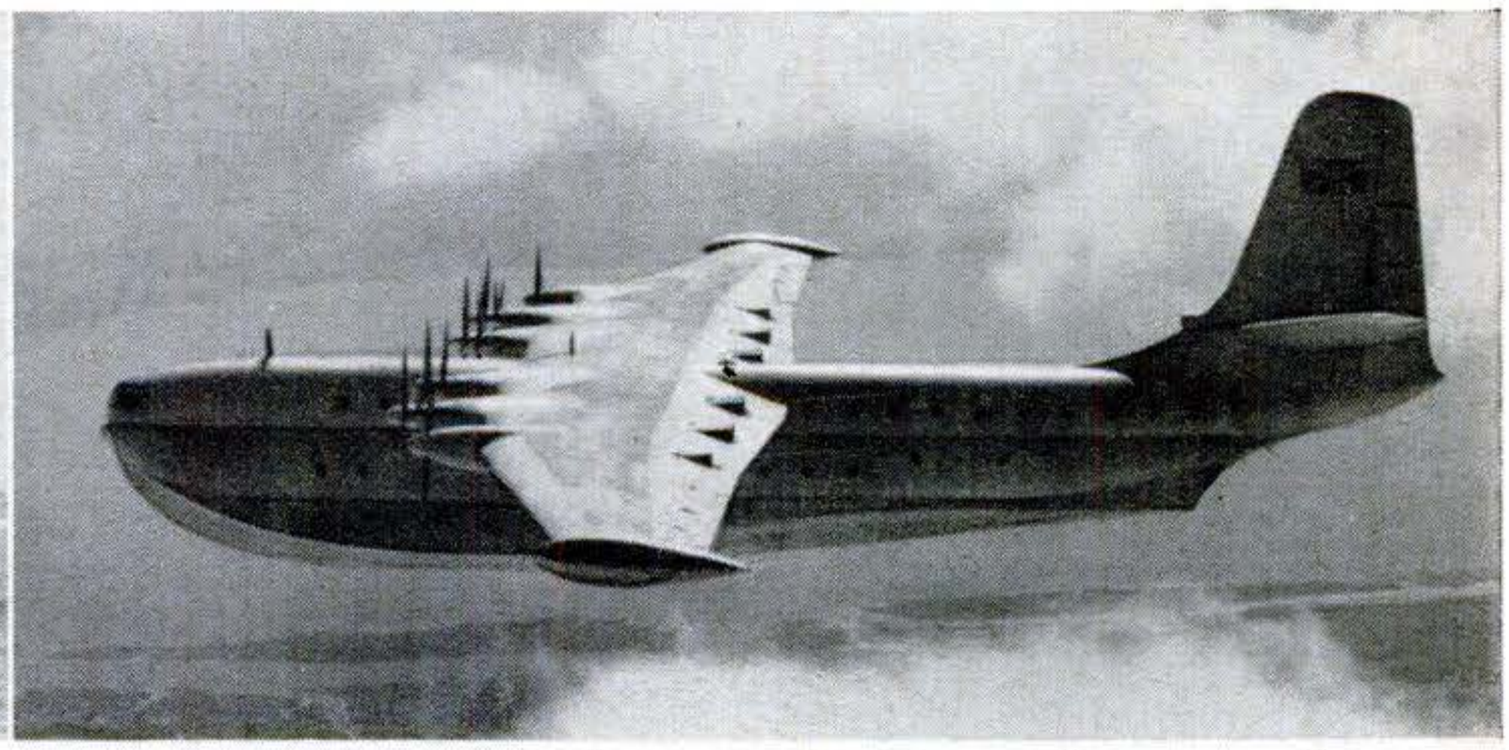
You see, jets consume enormous quantities of fuel. To get to its destination before running out of fuel, the jet relies on speed. Once the jet plane starts descent, it is committed to land.

Before the airlines can use *land-based* jets with any degree of safety and reliability, foolproof electronic landing aids will have to be developed that will permit them to land no matter what the weather.

On the other hand, had we been flying a *water-based* jet, we'd have landed at our original destination as a matter of course—and here is where I climb out on a limb to predict the future of jet airliners.

A decade ago it was thought that the flying boat—king-size version—would be the answer to ocean flying. In 1944, an $18 million order was placed by the War Department with Kaiser-Hughes Aircraft to build three huge eight-engine craft, an order that was subsequently canceled. For Howard Hughes' wooden monster was destined to failure even before it was

water than this. Powered by eight piston engines, it was designed to carry 700 troops.



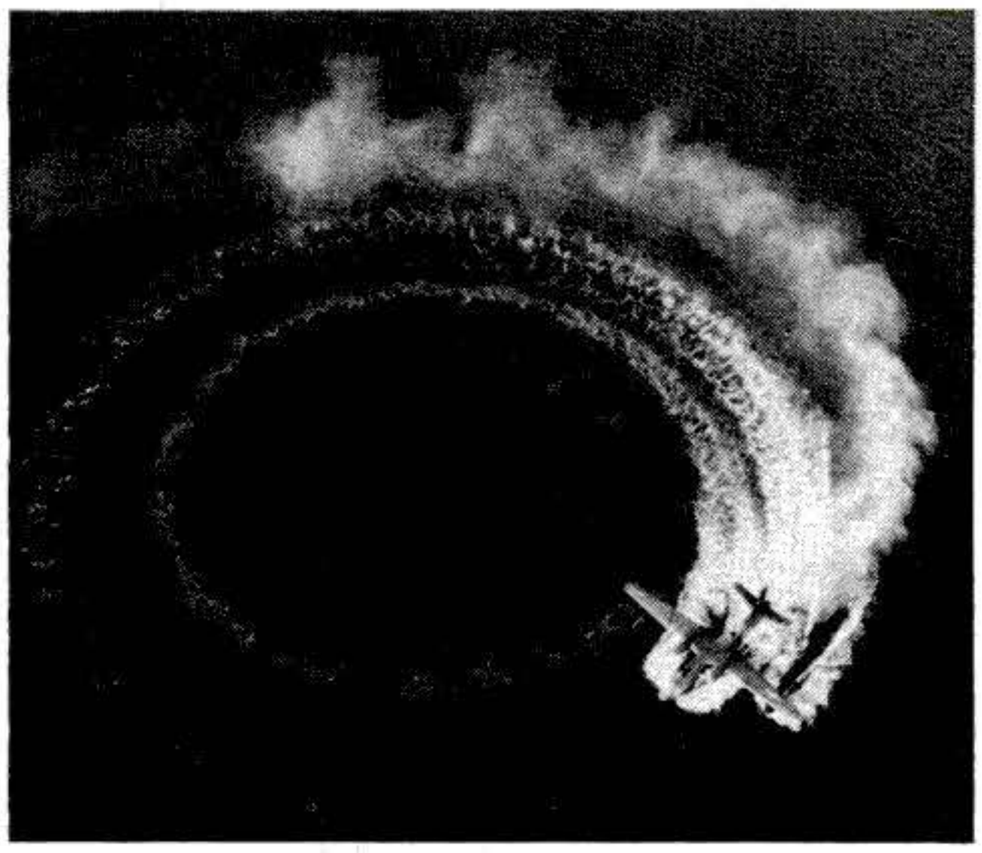
IN DOUBT: Britain's Princess is the biggest boat actually to fly. But plans for more were suspended when even its 10 turboprops proved to be not enough for satisfactory performance.

Copyrighted material

first sketched on the drawing board.

Why? Because of the propellers. Spray can damage a propeller as seriously as sand or gravel. To keep them clear of heavy spray they had to be placed high. But if they are mounted high, their line of thrust relative to the center of resistance of the plane is offset. Attach the string to the very top of a kite and it immediately takes a nose dive. It's the same with a flying boat, whether a World War I MF Boat or a supercolossal airliner. With the propellers high—and they have to be high—the plane wants to nose-dive when the power is applied.

Not so with a jet-powered flying boat. While the air intakes must be high enough to keep green water out of them, this is nowhere near so high as is the case with propellers. A jet flying boat can be at least as efficient as its land-based counterpart. For one thing the very substantial weight of the landing-gear mechanism is eliminated.



READYMADE RUNWAYS on rivers, harbors or lakes near most big cities are claimed by flying-boat enthusiasts as an advantage for seaplanes over land-based transports.

Another factor is the airport problem. The present trend toward longer runways, the tendency of housing developments to surround present airports, creating a noise problem as well as a hazard, is shoving airports ever farther from the cities. In some cases the time consumed bucking traffic to and from the airports exceeds the time in the air. This situation will continue to worsen.

Blind landing would be no problem for the jet flying boat. Blind landings could be accomplished in land-based planes if runways of sufficient length and breadth were available—five miles long and a half-mile wide, for instance; obviously impractical and economically out of the question, of course.

But on each of our coasts we have unlimited sea room.

Many of us old flying-boat pilots have made hundreds of completely blind landings. No special skill is required. You simply hold the airplane in landing position, with reduced power, and wait. Any boat pilot will tell you that these landings are invariably smoother than when they can *see* the water.

The pilot flying the jet flying boat of the future, when approaching his destination, will be assigned a specific "sea lane," which will be outlined by lighted buoys and have its own landing-aid radio frequency. In good weather he'll probably land in the East River, five minutes in a taxi from the New York hotel area.

Great strides have recently been made in the hydrodynamics of flying-boat hulls. Then there is the hydro-ski, or water ski: shock-mounted, it absorbs the initial impacts of rough water landings, relieving hull and wings from impact stresses. In flight the ski is simply retracted into the plane's structure. Convair's Sea Dart, a water-based supersonic fighter, takes off and lands on hydro-skis.

Glenn L. Martin has just this year brought out a four-jet flying boat for the Navy. Its reported speed is 600 miles per hour or better. With its cruising altitude of 40,000 feet, it would cut transcontinental flying time nearly in half. A passenger version of this plane would save an additional 30 minutes' ground travel at the eastern terminal by landing close to Manhattan.

Rarely would such a craft have to cancel a trip or be diverted because of thick weather. Foggy terminal weather could delay its docking, perhaps, but this would certainly be a minor inconvenience compared to winding up in Boston or Washington. END

Copyrighted material

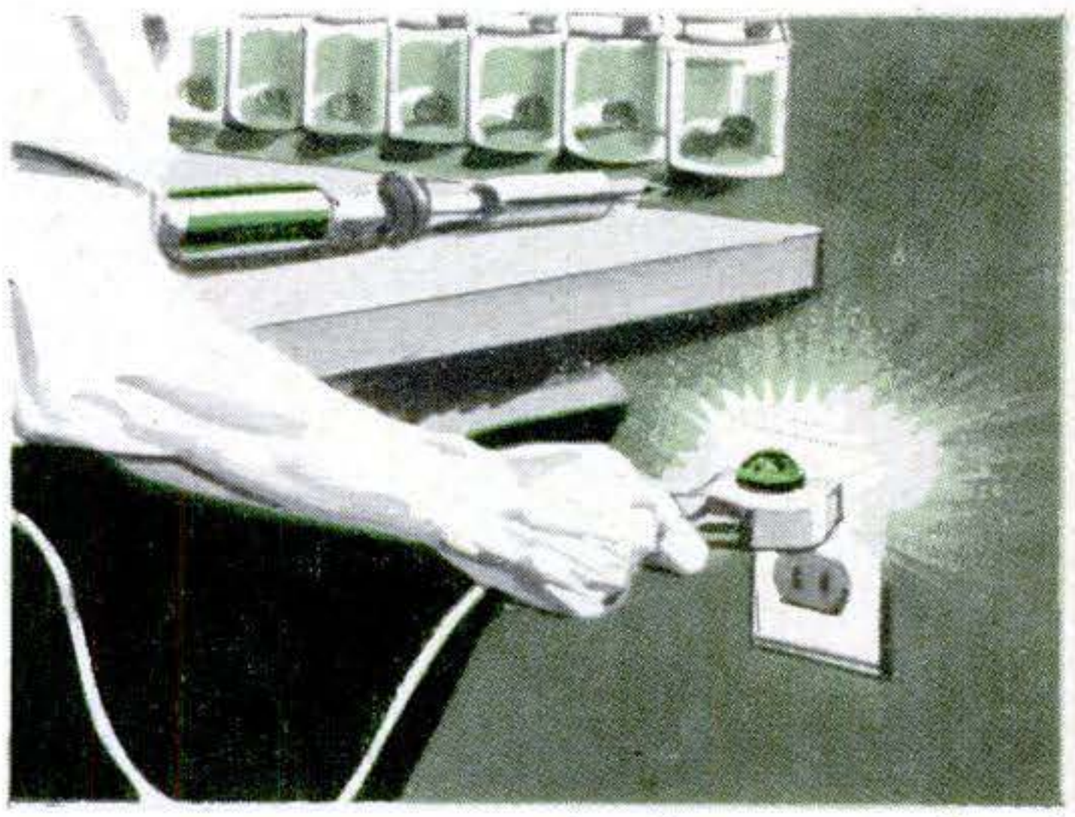
I'd Like to see them make...

A PLAYPEN WITH A GATE at one side, so that a mother could release a heavy baby without straining her back to lift him over the rail.—*Mrs. F. S. Elander, Puente, Calif.*

A SHOWER-BATH FOOTREST that could be mounted in a bathtub or shower stall, to eliminate balancing on one foot while scrubbing the other.—*L. Robert Oaks, Plainfield, N. J.*

A PULL-OUT WASTEBASKET under the front seat of an automobile. This is waste space anyway unless there is an under-the-seat heater.—*Earl Rasmusson, Grants Pass, Ore.*

A BEDCLOTHES CLIP at the foot of a Hollywood bed that would snap shut on the sheets and blankets. The bedspread would conceal it. —*Mrs. L. C. Short, Seattle, Wash.*

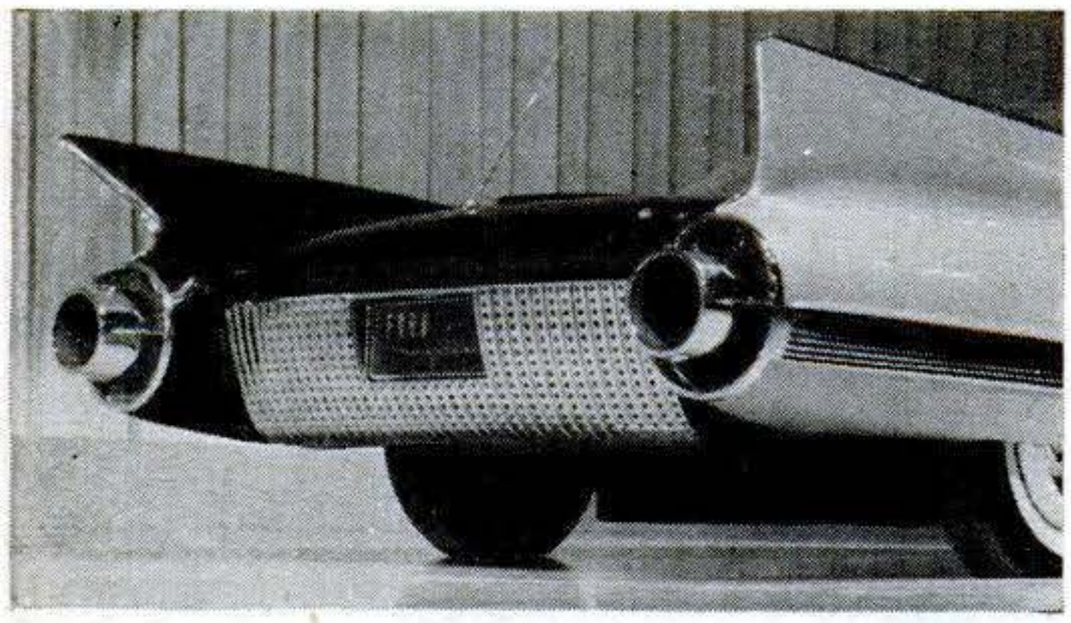


A RED PILOT LIGHT to plug between cord and socket so that you wouldn't go off and leave a kitchen appliance or a shop tool plugged in overnight.—*Bob Bruce, Edinboro, Pa.*

Everyone has his own pet idea of a gadget that he would like to see in general use. The five ideas illustrated above were suggested by POPULAR SCIENCE MONTHLY readers. What is *yours?* We will pay $5 for each one published. Please use Government postcards only. Write name and address clearly. Contributions cannot be acknowledged or returned.

Copyrighted material

Ford Designs A Body for a Gas Turbine



A FUTURISTIC concept of a passenger car that would be powered by a gas-turbine engine has been put on display by the Ford Motor Co. Called the Mystère, it is a sort of exercise in imaginative styling. The car contains innovations that could well find their way into future designing.

A huge bubble of glass serves as roof, windows and windshield. This canopy, hinged at the back, can be pushed up 70 degrees. Passengers get in and out through half-doors. The front seats swivel outward to make it easier.

A scoop at the top of the windshield supplies air to the passengers. Buttons on an overhead rib control the air, a heater and a blower.

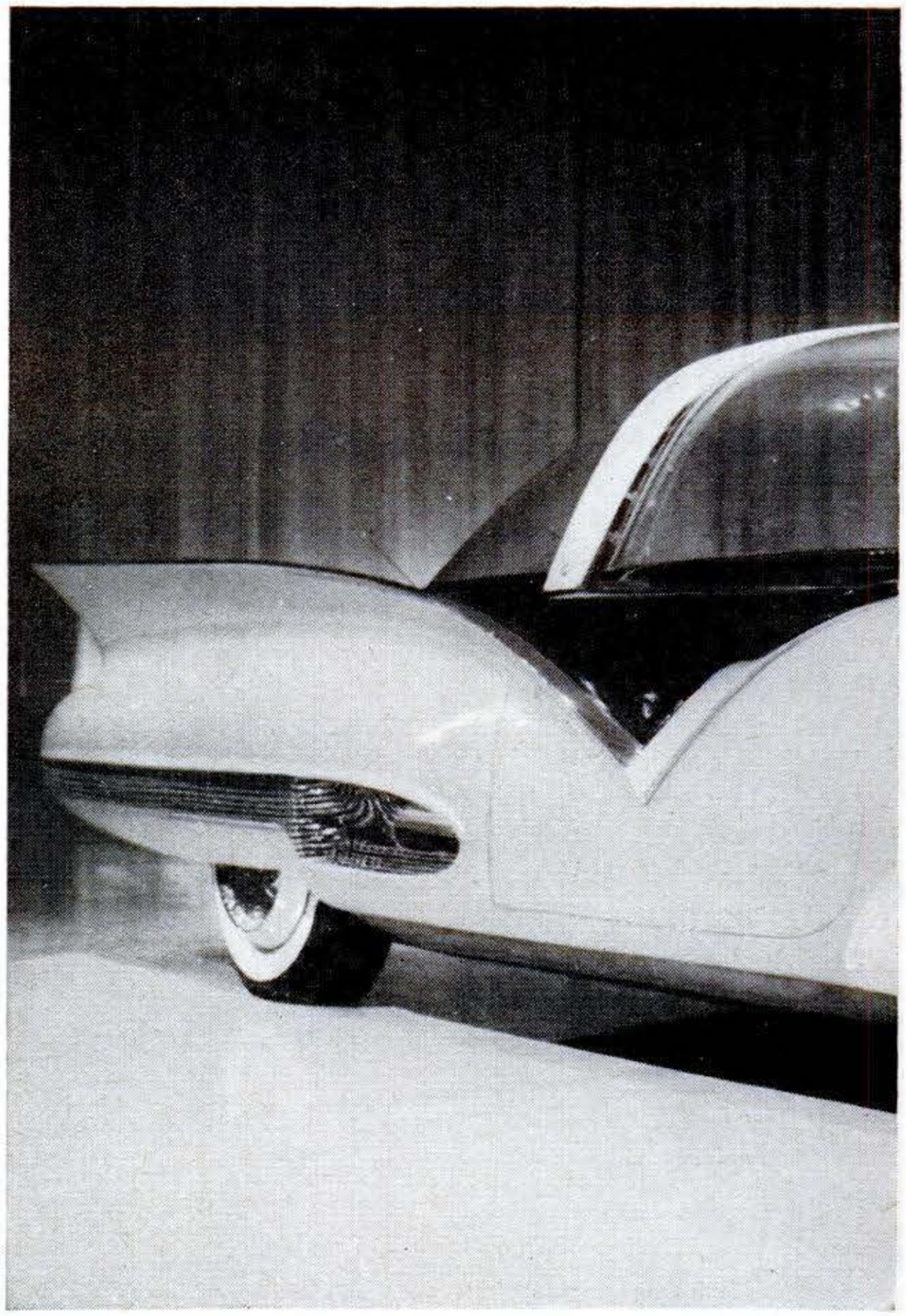
Big air inlets are indented on the rear fenders to supply the engine. Twin exhaust pipes are cannon-muzzle size.

Each headlight has two bulbs, one for city driving, one for the highway.

A push-button ignition switch works like the combination lock on a safe.

The panel of instruments is somewhat like that on a jet fighter. The faces are domed, can be read from any position.

The car has no engine, but provision has been made for one under the rear deck. Luggage and a spare tire would be carried under the hood.

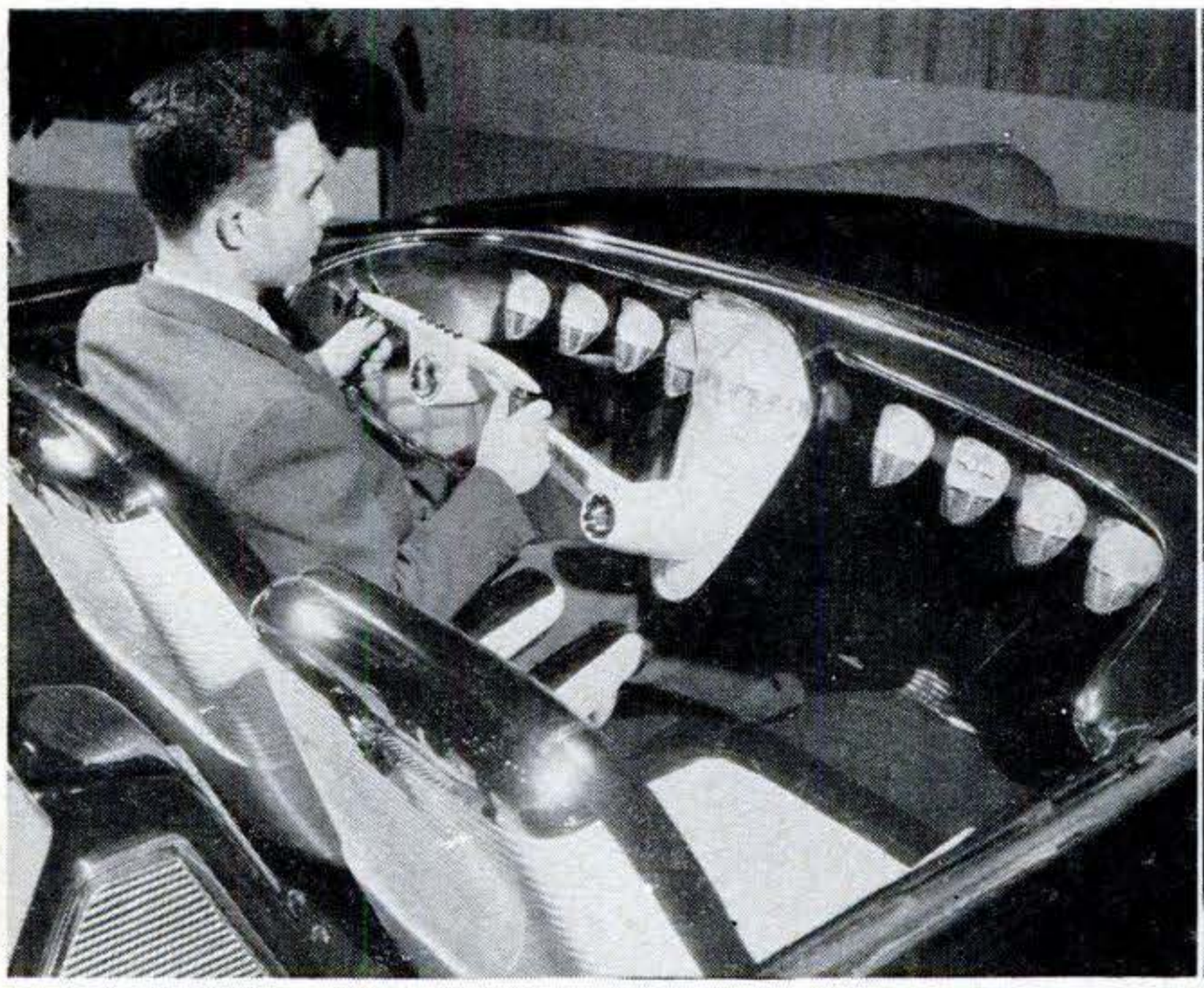


Body for the turbocar is only 52 inches high,

RADIOTELEPHONE reposes behind a console between the two rear seats—of the bucket type, like those in front. Because the car is completely closed in, it would be air-conditioned.

Copyrighted material

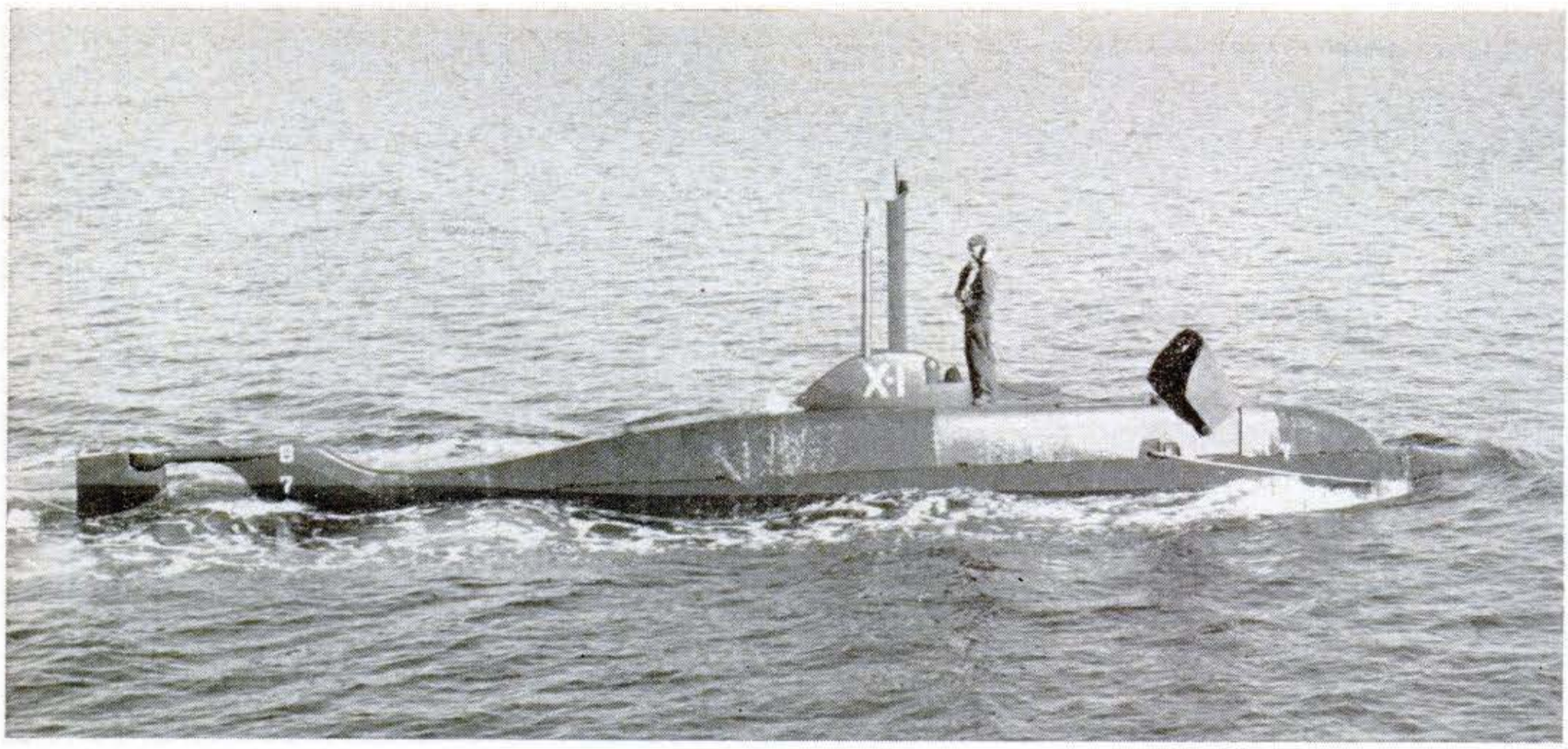
220 inches long and 80 inches wide. It could tote four people—how fast, nobody knows.



INSTRUMENT PANEL, reading left to right, shows: engine bearing temperature, oil supply, compressor r.p.m., fuel, speed, direction, pitch and roll, the time of day and the altitude.

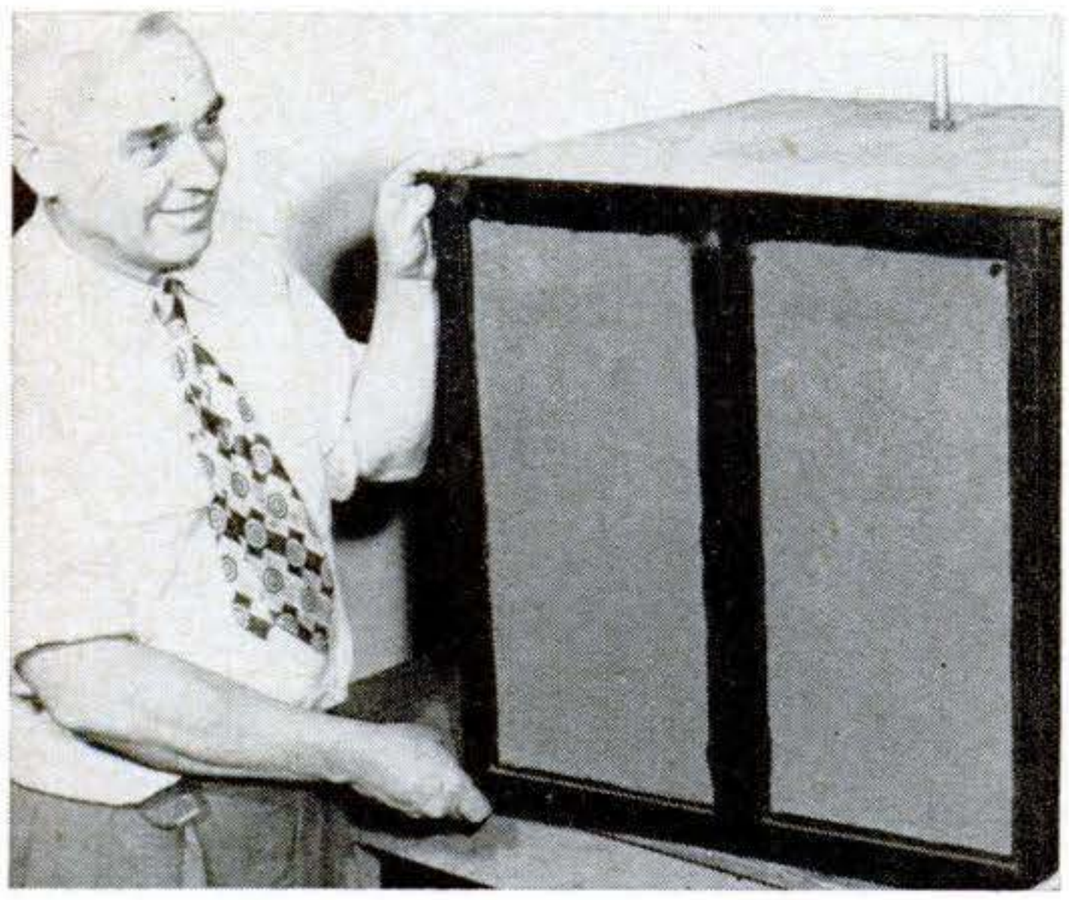
AIRPLANE-TYPE WHEEL "throws over" so that car can be driven from either front seat. A safety crash pad extends clear across the panel. Yup, that's a television set behind the front seat.

Copyrighted material



Navy's First Midget Sub Is Built to Fight in Close Quarters

CAPABLE of turning practically on a dime, a 50-foot submarine—first of a new Navy class—has been assigned the duty of testing our harbor defenses. Intended for close-in attacks on enemy harbors and shipping, it is steered like an airplane. Designed by the Fairchild Corp., it can be built in inland plants and transported to water.



Shelter Filters Atomic Dust

A CHEAP, chemically treated fiberboard has been developed for military and civilian atomic-bomb shelters. Called "diffusion board," it filters out poison gas, disease-laden particles and radioactive fall-out while admitting oxygen. Carbon dioxide given off in breathing passes through to the outside.

Dr. Alfred J. Stamm of the U.S. Forest Products Research Laboratory, who is shown at left with a small test model, has conducted pilot manufacturing runs at two plants with various species of wood pulp as a base. Equipment was much the same as that used in making ordinary building board.

They Say Now .....

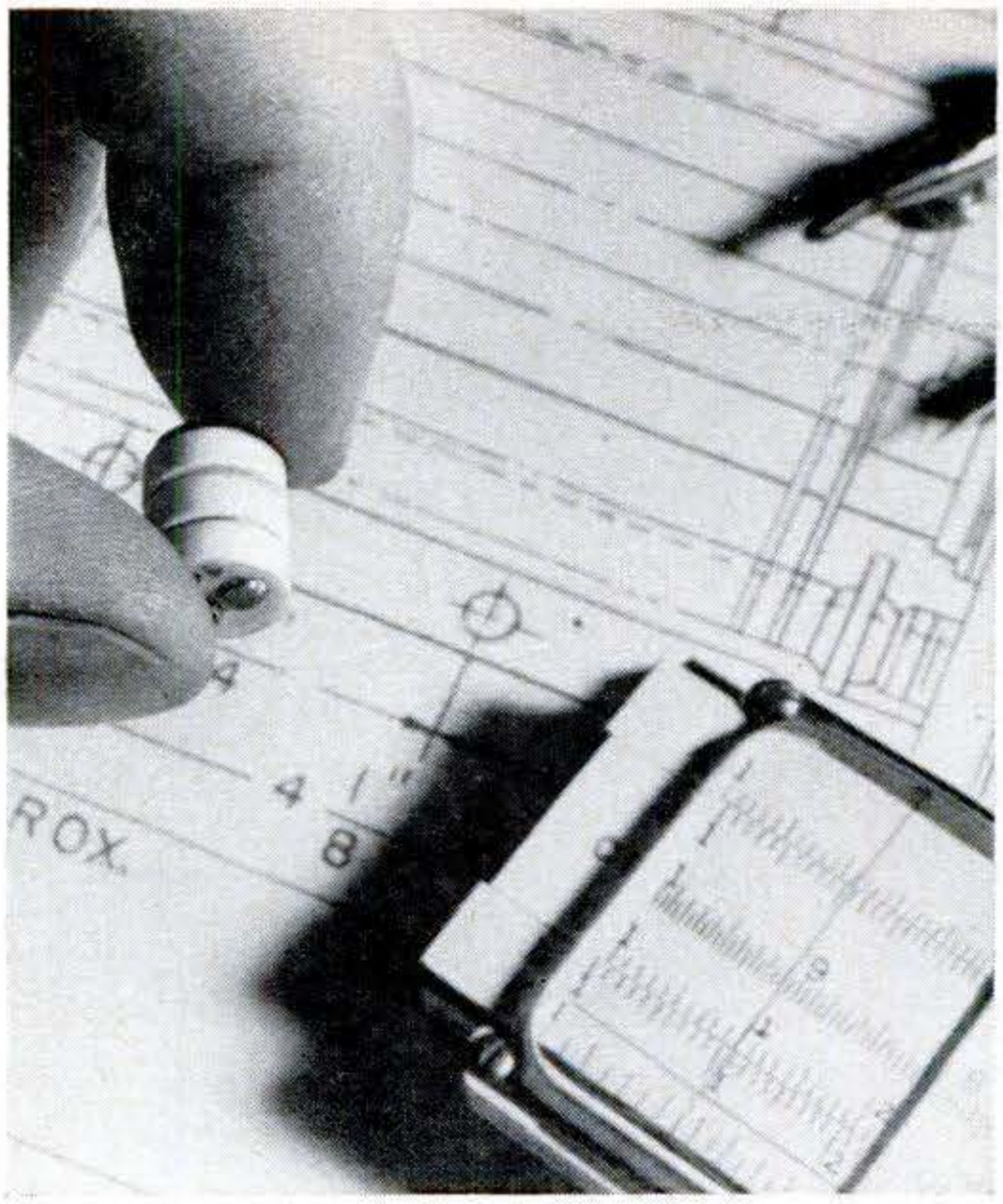
JOHN S. WINTRINGHAM, ETHYL CORP. RESEARCH LABORATORIES: *"During its lifetime, the average automobile consumes fuel having a total cost greater than that of the vehicle itself."*

J. J. PARKES, PRESIDENT OF THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS: *"The influence of the guided missile in various forms is beginning to make itself felt . . . If the atmosphere of international tension is now somewhat relieved, then the aircraft industries of the free world may claim some share of the credit."*

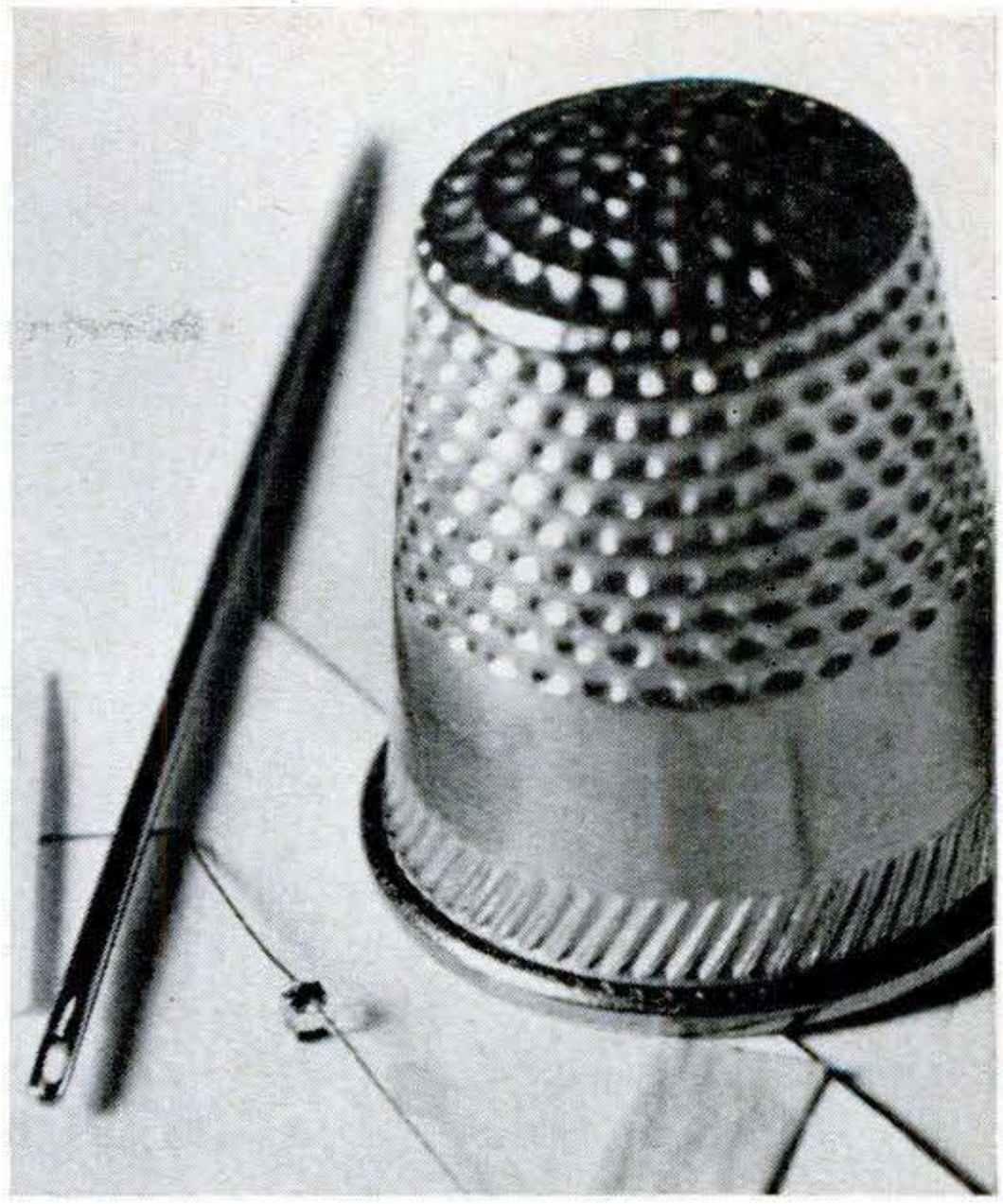
ALLISON C. NEFF, PRESIDENT OF THE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS: *"The future course of American industrial achievement and national defense will be largely dependent on the engineering skills which can be developed from the generation now in high school."*

DR. BOSTWICK G. KETCHUM, WOODS HOLE OCEANOGRAPHIC INSTITUTE: *"If we were all to disappear from the face of the earth tomorrow, most of life would go on unchanged. However, if . . . photosynthesis by green plants were to stop tomorrow, man would continue to live only as long as the stock on the grocer's shelf lasted."*

Copyrighted material



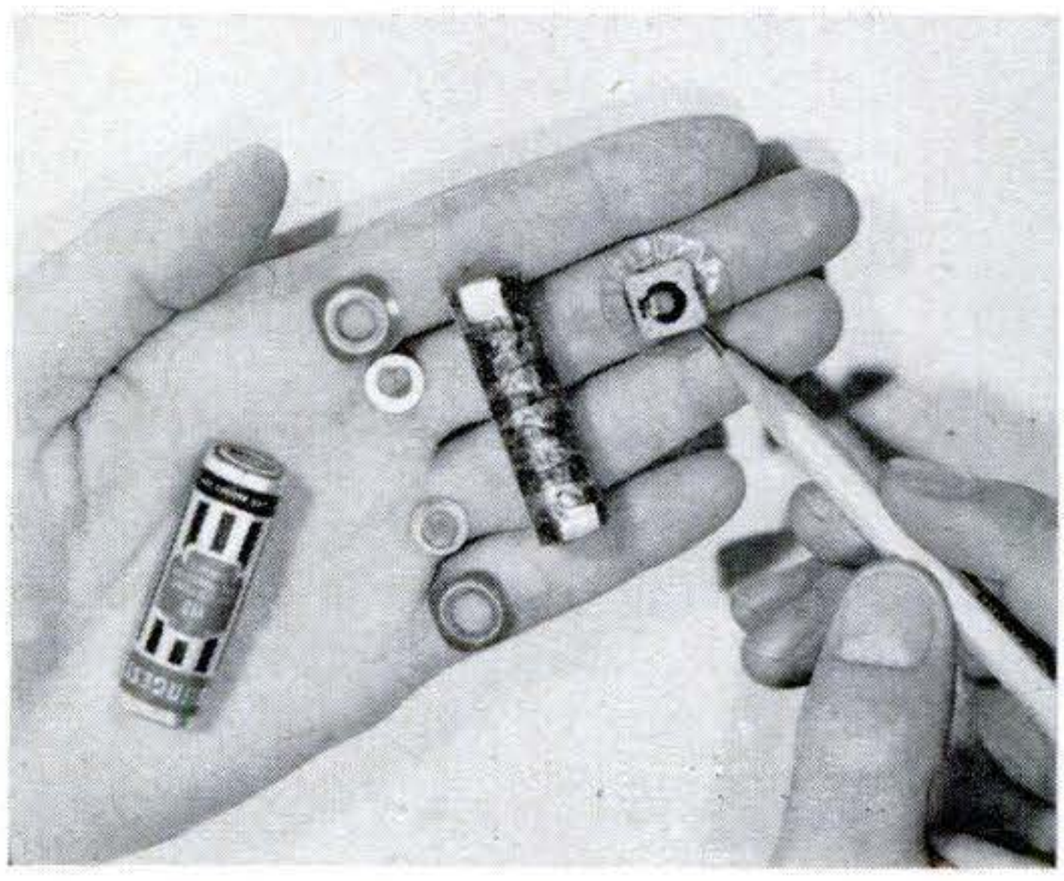
TV triode, low in noise and high in gain, may bring televison to areas now blacked out. A ⅜-inch-high stack of layers of ceramic and titanium, the tube tops 'em all for amplifying UHF signals, says GE. Its resistance to shock and vibration fit it for use in aircraft and heavy guns; its heat resistance, for jets and guided missiles.



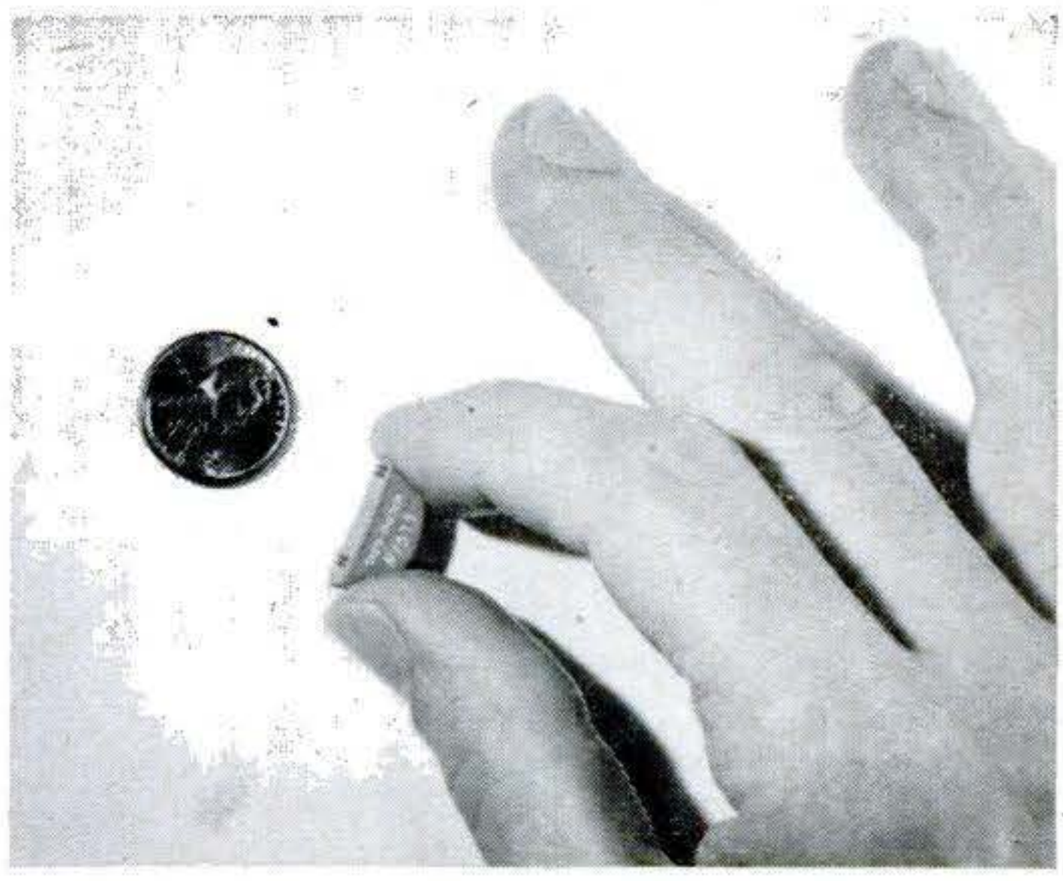
Electronic eyes, hardly bigger than a needle's eye, pack power to activate sorters for business machines or safety devices on heavy machinery. Because they're so tiny, they can pinpoint intricate light patterns, says the Electronics Corp. of America. In military use the photosensitive cells could determine the pattern of moving targets.

Tiny Things Make Big Things Go

Wafer battery cells, packed 13 high in a two-inch plastic tube and insulated by thin Pliofilm, deliver a 22½-volt wallop. A third more powerful than conventional flat cells, they are made by the Burgess Battery Co., Freeport, Ill., for use in pocket radios, Geiger counters, photoflash cameras and other small electronic devices.



Wrist-watch power pack is smaller than a penny yet delivers almost constant voltage for two years. It won't leak, swell or emit gas. Developed by Elgin, it is made of indium, a metallic element new to batteries, and secret cathode materials. Some expected uses: powering hearing aids, recording devices and self-focusing cameras.



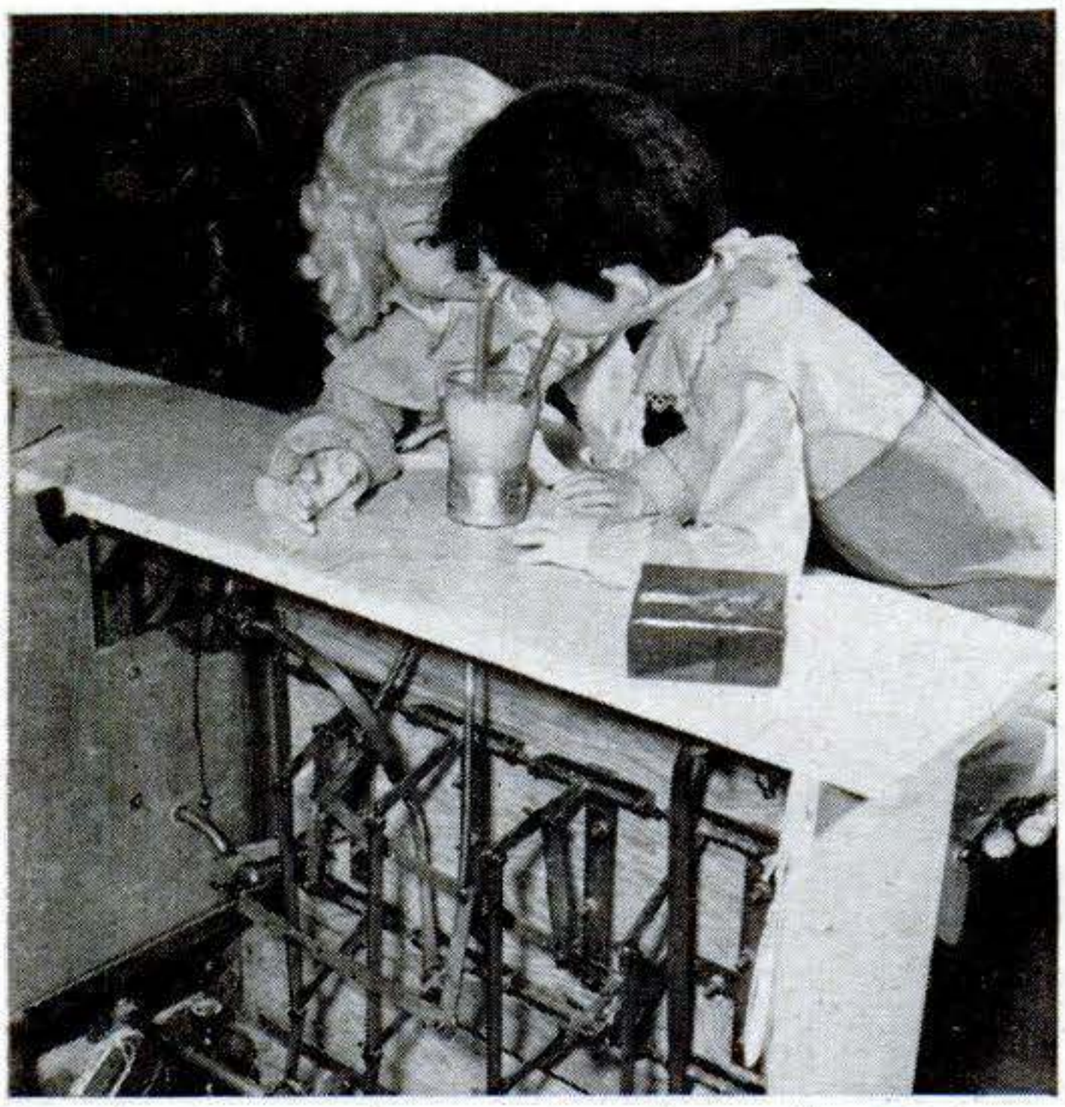
Copyrighted material

America's Favorite Christmas Windows

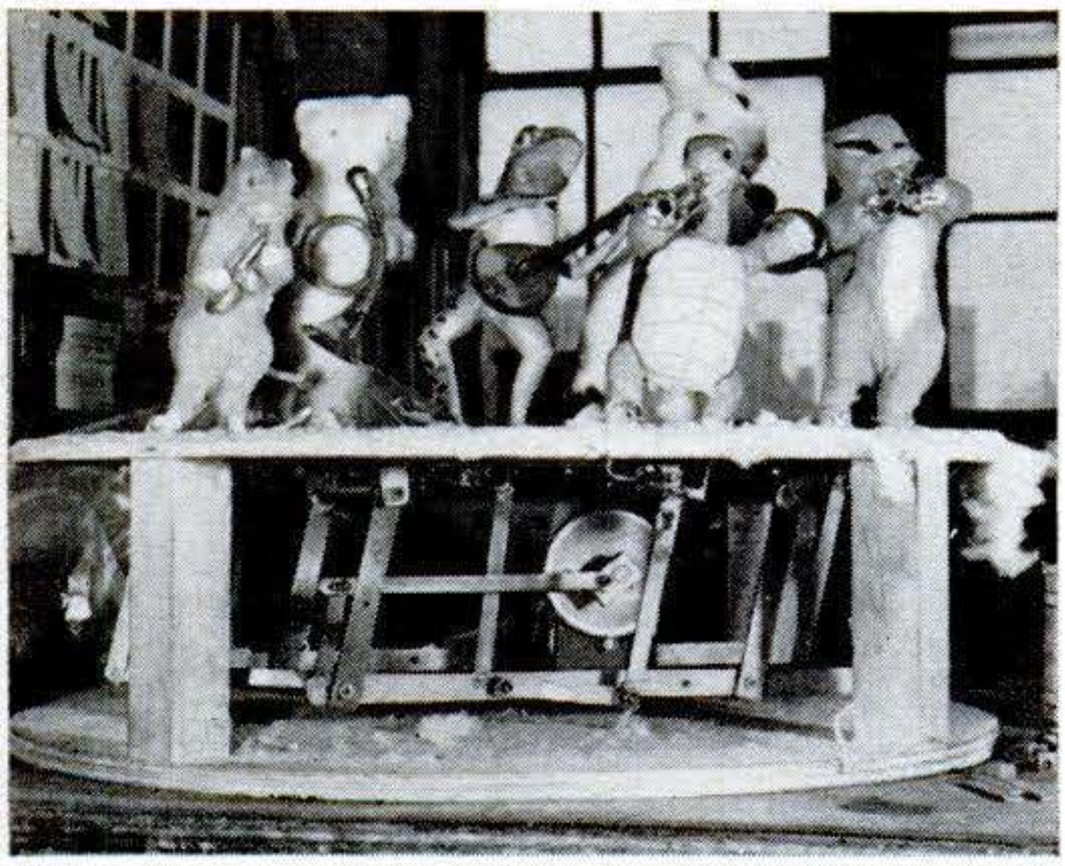
These mechanized displays, which you'll see in the big stores this holiday season, were engineered to stop sidewalk traffic.

By Gardner Soule

"THIS one will be," says George Grant Silvestri, "the movingest Christmas yet." He should know, because he dreams up and manufactures the elaborate Christmas windows that so many U.S. department stores display.



Mechanism under counter jigs soda drinkers.



Motors, cams, levers animate dance band.

Some 150 other display manufacturers do likewise; but Silvestri's yearly gross—nearly two million dollars—makes him, he says, the biggest.

Merchants throughout the nation buy his windows for exactly one purpose: to stop you and lure you inside.

"That means motion," says Silvestri. "Lots of moving figures. I've never seen people seven, eight or 10 deep before a still window."

Silvestri has, accordingly, spent the last 12 months getting into his 1955 windows every moving object that he can think of, to keep you from walking past. His hopes are based on solid past performance. One New York City store has to erect barricades in front of its Silvestri windows annually, and needs both private guards and city policemen to manage the crowds.

Some of his windows contain only one moving figure (like an angel playing a harp) and cost only about $950. Other windows have as many as a dozen dolls (the trade name for them) in motion: Santa Clauses, animals, reptiles, fish, birds, angels, shepherds, Wise Men, fairy-tale and storybook people.

The most carefully kept secret in Silvestri's trade is what the year's windows will show. For this Christmas, Silvestri sprang on his competition, as the cream of his displays, the three "spectaculars" shown in color on the next three pages:

Animals in the woods. This is a whole series of window displays, each holding dozens of animals that do dozens of things. The displays sell for $5,975 each, and a store can buy any number, or even a part of one.

[Continued on page 238]

Copyrighted material

Country Store

IN AN ELABORATE '55 STORE WINDOW, in the photo at top, the postmistress throws up her hands at packages. Other figures warm themselves at the stove. At the fountain, in the bottom picture, soda (colored with Easter-egg dye) overflows as soda jerk flirts. Boy and girl at left alternately bend over soda, straighten up.

Copyrighted material

Animals in the Woods

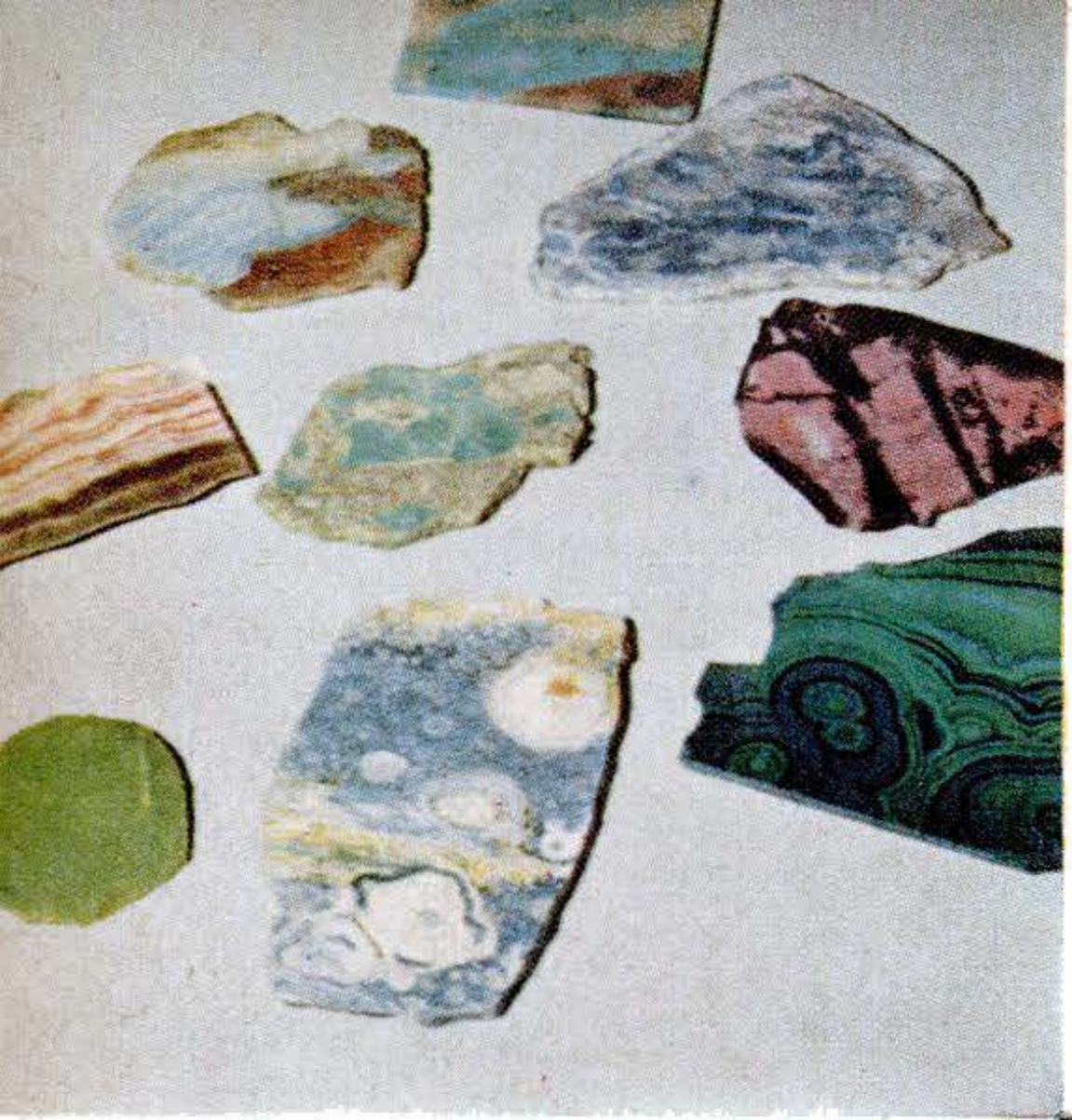
WOODLAND FOLK below watch swimming fish, one of a series of animal displays. In the feast at right, a bunny tosses salad, a raccoon, rabbit and squirrel eat sundaes, birds peck crumbs, a raccoon cuts cake, a baby skunk drinks milk.

The Christmas Story

STAINED-GLASS FIGURES above resemble church windows. In the Nativity scene at right, the Three Wise Men and shepherds follow the Star of Bethlehem across the window, and then turn to behold Mary, Joseph and the Holy Child.

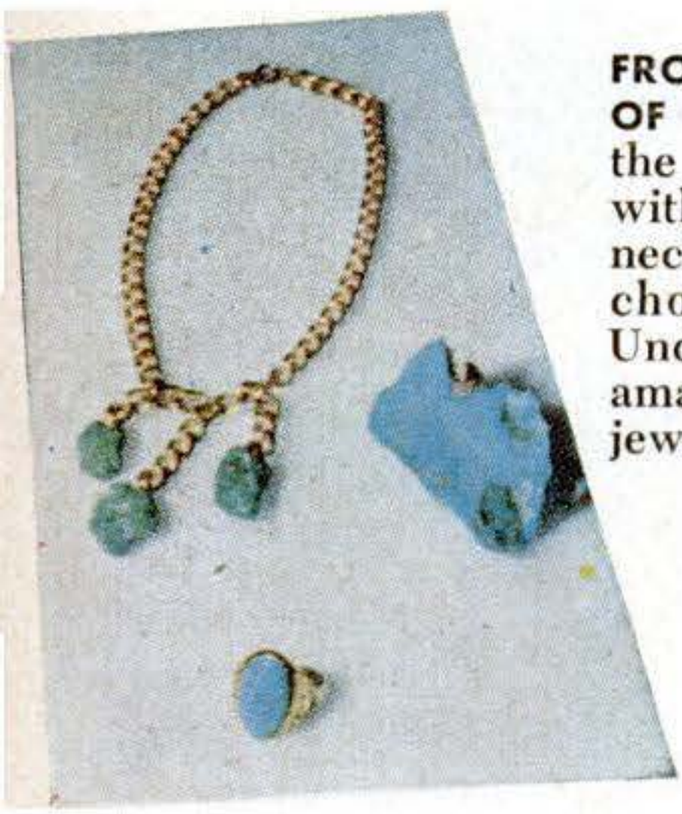
Copyrighted material

Cutting semi-precious stones

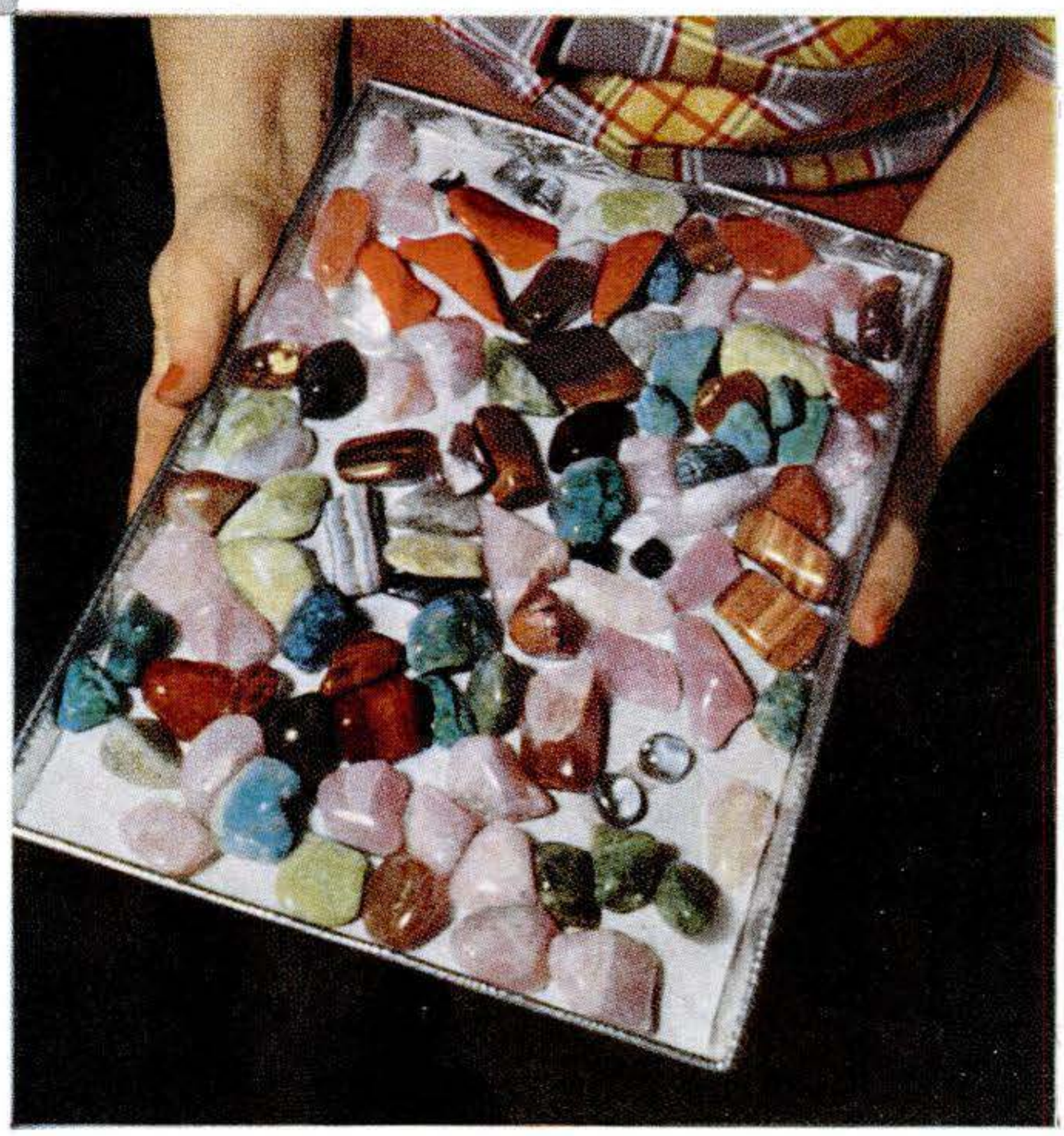


JEWELS IN THE ROUGH, these slabs of rocks and minerals are, reading clockwise from top center: chrysocolla (Arizona), lapis lazuli (Chile), rhodonite (Patagonia), malachite (Belgian Congo), thomsonite (Mexico), vesuvianite (California), rhodochrosite (Patagonia) and grossularite (Oregon). At the center is variscite, from Utah.

BAROQUES (below) are small pieces of rocks and minerals that have been tumbled around in a steel drum with first an abrasive, then a polishing agent for 16 to 20 days.



FROM A FRAGMENT OF TURQUOISE like the one displayed with them came the necklace and cabochon ring at left. Underwood teaches amateurs to create jewelry like this.



A RARE DISCOVERY, these fragments of vesuvianite (green areas) in a chloride schist were brought in by two rock hunters who found them in a California canyon.

A SINGLE BAROQUE of ruby-colored slag cemented to a mount at one end of a heavy, ornamental chain (below) makes a striking belt for a lady. The process took only a few minutes.

Copyrighted material

started as a hobby. Now . . .

Do-It-Yourself Jewelry Is a Booming Business

By Wesley S. Griswold

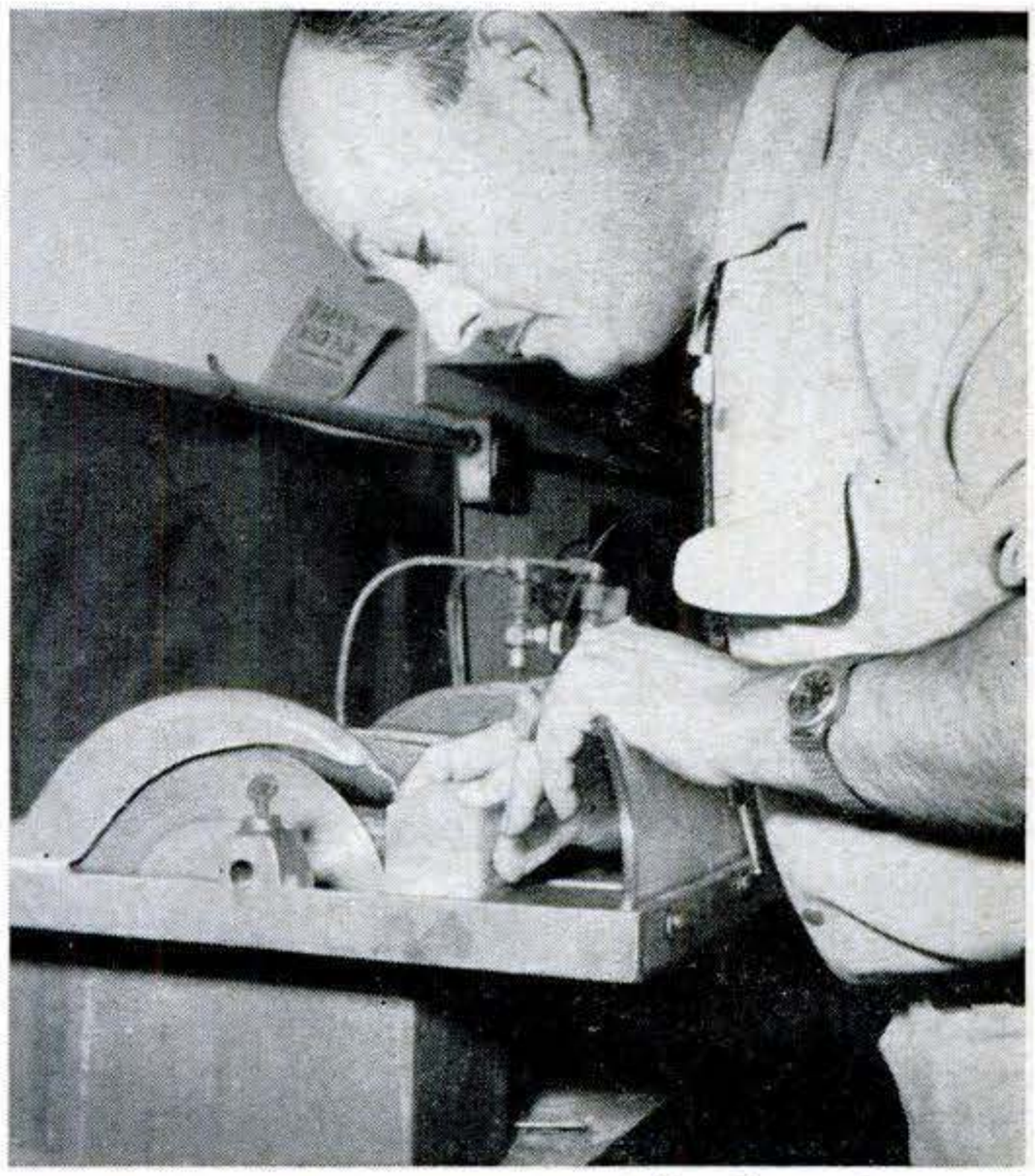
IF IT would improve your standing in the family to be able to deck your wife with jewels, you might well consider taking up a new hobby—that of cutting, polishing and setting semi-precious stones.

Jewels aren't the only end-product. Amateur lapidaries (that's the formal name for devotees of this indoor sport) also make tables, lamps, mosaics, sculptures and bookends out of pretty rocks.

Out West, where the raw material is closer at hand than elsewhere and more varied, there are at least 75,000 lapidaries in the San Francisco Bay area alone. Throughout the nation, there are estimated to be 2,000,000.

Hobbyists range in age from six to 90. Two of the more unusual ones are Lloyd and Florence Underwood, of Belmont, Calif. These two are in the enviable situation of having parlayed their hobby into a thriving business. They sell the raw materials, create a wide range of products and market them, and teach others how to do likewise.

A handful of agates lured Lloyd, a former heating contractor, into working with rock. He fell under the spell of colorful stones while on a vacation eight years ago. Now his wife, too, is so entranced that she was overjoyed recently when a 93-pound chunk of dirty rock was dumped on her kitchen floor. The rock was California vesuvianite. It didn't look like much to a visitor, though it had interesting waxy-green streaks in its gray bulk. But Florence Underwood gazed at it with delight. She said that it was extremely rare in both quality and size, and those green streaks could be cut up into lovely rings, pins and earrings.



STARTING FROM SCRATCH, Lloyd Underwood begins sawing up a chunk of semi-precious stone, as it occurs in nature, into quarter-inch slabs to be ground and polished into gem stones.

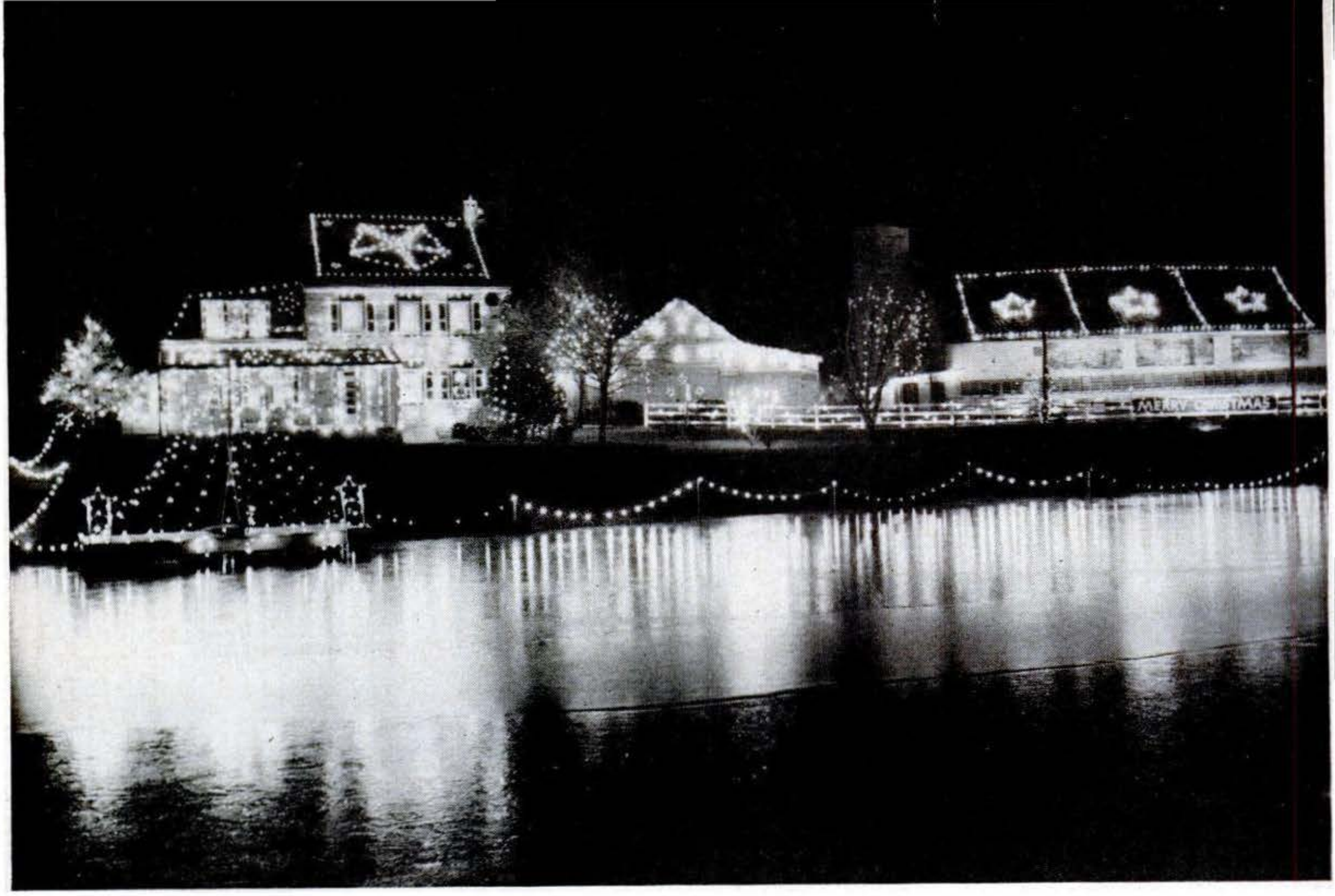
Mrs. Underwood is a composer with 17 major musical works to her credit. In 1953, the San Diego Symphony Orchestra played her tone poem, "A Hopi Indian Legend." It was a gratifying success, the pinnacle of her career. Determined to avoid a letdown, she immediately began searching for a fresh challenge.

A business in five figures resulted. Down by the tracks in Belmont she found a vacant shop. Only after it was rented did she let Lloyd in on her scheme—to set up a place where people like her husband could come to buy stones or learn about them, get acquainted with the tools needed to make objects out of them, and be taught how to use the tools.

She engaged Lloyd to instruct evening classes in lapidary work, and a retired

[Continued on page 244]

Copyrighted material



7,800 Christmas Lights Illuminate a Pennsylvania Farm

FIVE miles of lights glow to tell the world it's Christmas on the farm of William M. Koziar near Reading, Pa. He has strung 7,800 colored bulbs on 28,750 feet of wire over his house, barn, sheds and chicken house, and around fences, trees, shrubs and a sizable pond. Four 230-volt circuits feed the outdoor display as well as indoor Christmas scenes, and power loudspeakers amplifying recorded holiday music for added atmosphere.

Ground Nozzles Douse Fire

A SUDDEN ground fire in Boeing's aircraft fueling area at Seattle would be doused by a system of turret nozzles that eject a three-inch blanket of flame-smothering foam in less than a minute (above). Thermostats or push buttons in ground stations set off this spray and also water-fog nozzles to curtain off the flames and keep them from spreading.

Dollies Move 200-Ton Hangar

AIR traffic is stopped while this 200-ton airplane hangar is moved a mile to a new site by Mobilized House Movers, Inc., Austin, Tex. The half-acre shelter was jacked up on 14 four-wheel dollies and pulled by two trucks. It will be the nucleus for a 900-foot-long Southwest Airmotive service and passenger terminal at Love Field, Dallas.

Copyrighted material

The New TVs Are Bigger, More Powerful

Lots of changes inside the cabinets give '56 sets brighter and sharper pictures—even in the fringe areas.

By Hubert Luckett and Martin Mann

THE 1956 television receivers are like the 1956 cars. They are bigger, more powerful, and considerably easier to operate.

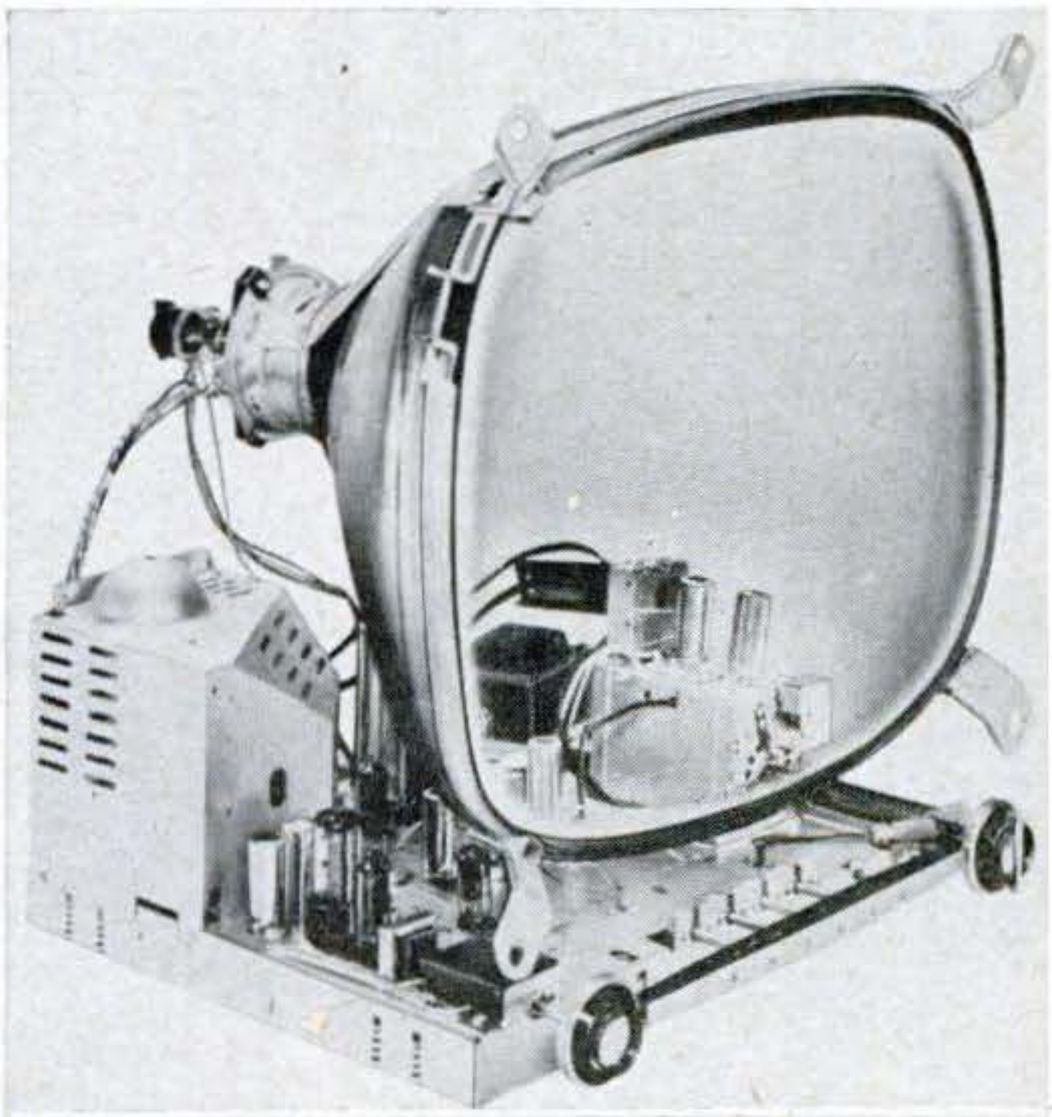
On the following two pages you will see a chart comparing 22 makes of new sets. The listing is by chassis. The same chassis is often used for many models.

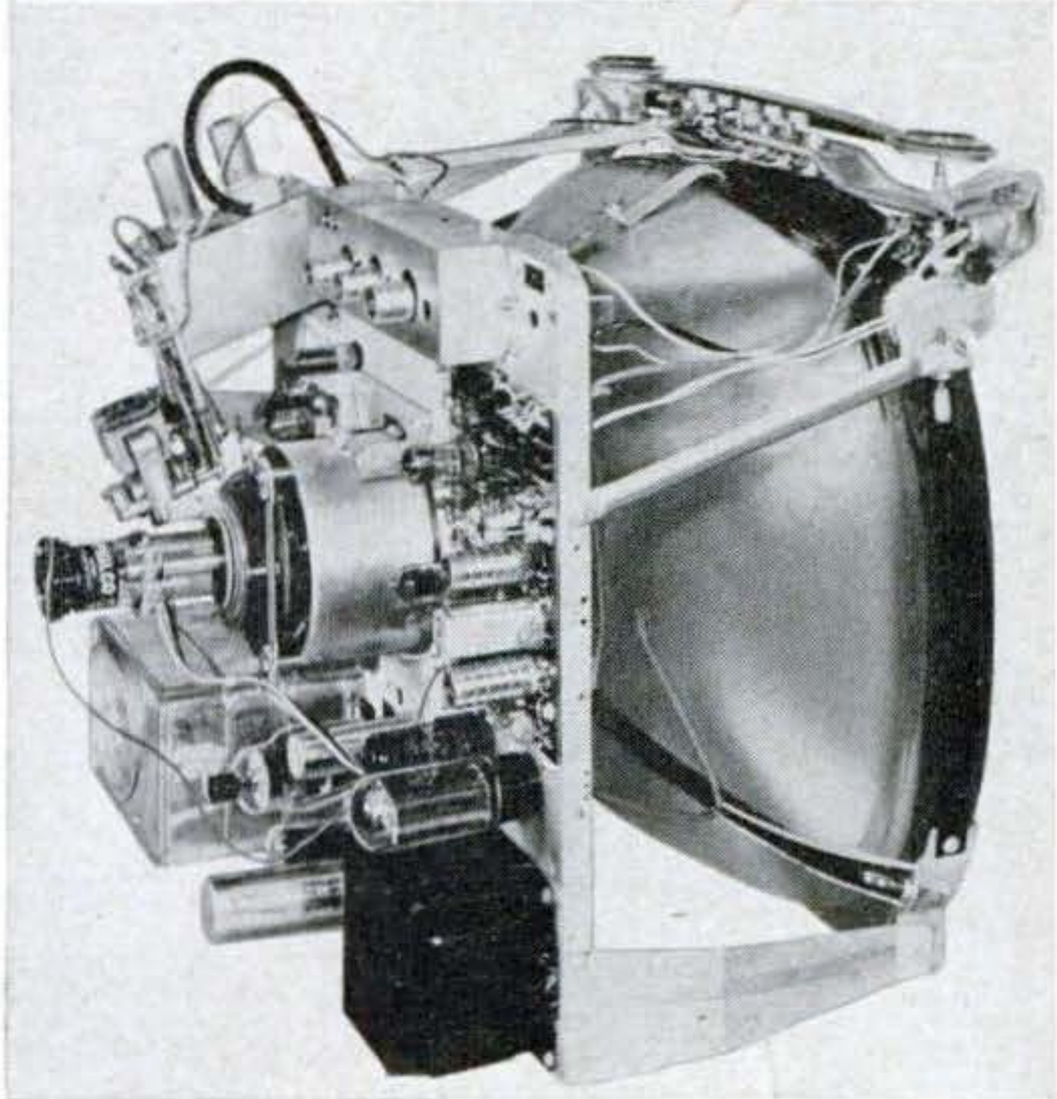
The difference between models is generally in the picture-tube size, the cabinet and the loudspeaker. Sometimes, however, a maker will soup up a low-priced chassis for higher-priced models, leaving it basically the same but adding better picture tubes and tuners.

Picture tubes. Twenty-one-inch tubes are the most popular size now. Some of them give bigger pictures than others, but the difference is not as great as you may be led to believe.

The variation seldom exceeds five or 10 square inches—two to four percent of the total picture area.

[*Text continued on page 122*]





WHY THE CONTROLS ARE ON TOP. They are convenient there, but they also naturally come out that way when the chassis is arranged vertically, as it is in many of the new sets (lower photo at right). A conventional horizontal chassis is shown in the upper picture. Vertical chassis is more compact, lighter in weight, and somewhat easier to service.

For a box score of '56 TV sets, please turn the page

Copyrighted material

1956 TV SETS

	CHASSIS DESIGNATION	PICTURE TUBE			LOCATION OF CONTROLS									PICTURE DETAIL	
		Face	Focus	High Voltage	Tuning & Volume	Brightness	Contrast	Vertical Hold	Horizontal Hold	Height	Width	Vertical Linearity	Horizontal Linearity	No. IF Stages	IF Band Width (megacycles)
ADMIRAL	17"-21"-24" Advance Cascode	alum.	auto.	18,000	front	side	side	side	rear	rear	none	rear	none	3	3.5
	21"-24"-27" Super Cascode	alum.	auto.	18,000	front	front	front	front	rear	rear	none	none	rear	3	3.5
CAPEHART	21"-24" CX-43	alum.	auto.[b]	15,000	side	side	side	side	side	inside	none	inside	none	3	3.25
	21"-27" CX-38S	alum.	auto.[b]	18,000	front	front	front	front	front	rear	rear	rear	none	3	3.25
CBS-COLUMBIA	21" 1611	alum.	auto.[b]	15,000	front	rear	front	front	front	rear	none	rear	none	3	3.35
	24" 1621	alum.	auto.	18,500	front	rear	front	front	front	rear	rear	rear	none	3	3.35
CROSLEY	17"-21" Advance	alum.	auto.	13,000	side	rear	side	side	side	inside	none	inside	none	3	3.5
	21" Custom V	alum.	auto.	14,500	side	side	side	side	side	side	none	side	none	3	3.5
	21" Eldorado	alum.	magn.	16,500	front	front	front	front	front	front	rear	front	rear	4	3.5
DuMONT	21" 352	gray	auto.	14,500	front	front	front	front	front	rear	rear	rear	none	3	3.50
	21" 350	alum.	auto.	14,500	front	front	front	front	front	rear	rear	rear	none	3	3.50
	21"-24" 340	alum.	auto.	17,500	front	front	front	front	front	rear	rear	rear	none	3	3.75
FLEETWOOD	21" 610B	sold separately			front	front	front	front	front	front	n.a.	front	n.a.	4	4.0
	21"-24"-27" 810	sold separately			front	front	front	front	front	front	n.a.	front	n.a.	4	4.0
	21"-24"-27" 800	sold separately			remote	remote	remote	front	front	front	n.a.	front	n.a.	4	4.0
GENERAL ELECTRIC	17"-21" Pacer "N"	gray	auto.[b]	n.a.	front	front	front	front	rear	rear	rear	rear	none	3	3.25
	21"-24" Pacer "S"	alum.	auto.[b]	17,000	front	front	front	front	rear	rear	rear	rear	none	3	3.25
	21" Ultravision	alum.	auto.[b]	17,000	front	front	front	front	rear	rear	rear	rear	rear	3	3.25
HALLICRAFTERS	21" A-1900	alum.	auto.	12,600	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3	n.a.
	21"-24" A-1850	alum.	auto.	12,600	side	rear	side	side	side	inside	inside	inside	none	3	3.25
	21" A-2000	alum.	auto.	12,600	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3	n.a.
HOFFMAN	17"-21"-24" Mark X	alum.	magn.	n.a.	front	front	front	front	rear	rear	rear	rear	none	3	3.5
	21"-24" Super Mark X	alum.	magn.	n.a.	front	front	front	front	rear	rear	rear	rear	none	3	3.5
	21"-24" Mark V	alum.	magn.	17,500	front	front	front	front	rear	rear	rear	rear	none	4	3.75
MAGNAVOX	17"-21"-24" 600	alum.	auto.[b]	16,000	top	top	top	top	top	rear	rear	rear	rear	3	3.2
	21"-24" 650	alum.	auto.[b]	15,000	top	top	top	top	top	rear	rear	rear	rear	3	3.2
	21"-24" 350	alum.	auto.	15,000	front	front	front	front	front	rear	rear	rear	rear	3	3.2
	27" 500	alum.	auto.	20,000	front	front	front	front	front	rear	rear	rear	rear	4	4.0
MIDWEST	21" C22	gray	auto.	14,000	side	side	side	side	rear	rear	none	rear	none	3	3.1
	21" TC26	alum.	auto.	17,000	front	front	front	front	front	rear	none	rear	none	4	3.1
MONTGOMERY WARD	17"-21" GSL	alum.	auto.	12,500	front	rear	front	rear	rear	rear	none	inside	none	3	2.85
	21" GSE	alum.	auto.[b]	13,500	front	front	front	front	front	rear	none	rear	none	3	3.0
	21" WG	alum.	auto.	16,000	front	front	front	front	front	rear	none	rear	none	3	3.35
	21" Supreme	alum.	auto.	16,000	front	front	front	front	front	rear	rear	rear	none	3	3.35
MOTOROLA	21" TS530	gray	auto.	17,000	front	front	front	front	front	rear	rear	rear	none	3	3.7
	21"-24" TS534	alum.	auto.	18,000	front	front	front	front	front	rear	rear	rear	none	3	3.7
	21"-24" TS533	alum.	auto.	18,000	front	front	front	front	front	rear	rear	rear	none	3	3.7
PACKARD-BELL	17"-21" V8-1	alum.	auto.[b]	16,000	side	side	side	side	rear	inside	none	inside	none	3	3.0
	21"-24" 88S1	alum.	auto.[b]	15,000	front	front	front	front	front	front	none	front	none	3	3.0
	21"-24" 98D1	alum.	auto.[b]	15,000	front	front	front	front	front	front	none	front	none	3	3.0
PHILCO	17"-21" 330	gray	magn.	14,250	front	front	front	front	front	rear	rear	rear	none	3	3.25
	21"-24" 390	alum.	magn.	14,750	front	front	front	front	front	rear	rear	rear	none	3	3.25
	21"-24" 440	alum.	magn.	15,000	top	top	top	top	top	rear	rear	rear	none	3	3.25
RAYTHEON	21" 21T193C Starmonic	alum.	auto.	n.a.	top	top	top	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3	2.9
	21" 21T40 Aristocrat	alum.	auto.	n.a.	front	front	front	front	front	front	inside	front	none	3	3.1
RCA	17"-21" Special	alum.	auto.	15,000	top	top	top	top	top	inside	inside	inside	none	3	3.2
	21"-24" Super	alum.	magn.	17,000	top	top	top	top	top	inside	inside	inside	none	3	3.2
	21"-24" Deluxe	alum.	magn.	17,000	side	front	side	front	front	rear	rear	rear	none	3	3.2
SEARS, ROEBUCK	17"-21"-24" "Fringe Area"	alum.	auto.[b]	14,000	side	rear	side	side	side	rear	none	rear	n.a.	3	3.0
	21"-24" Super Power	alum.	auto.[b]	18,000	front	rear	front	front	front	rear	none	rear	n.a.	3	3.0
SYLVANIA	21"-24" 32	alum.	auto.	18,000	front	front	front	front	front	rear	rear	rear	rear	3	3.3
	21"-24" 33	alum.	auto.	18,000	front	front	front	rear	rear	rear	rear	rear	rear	4	3.8
TECH-MASTER	21"-27" 5618	sold separately			front	rear	front	rear	front	rear	rear	rear	rear	3	3.5
	21"-24"-27"-30" 2430-S	sold separately			front	front	front	front	front	rear	rear	rear	rear	4	3.9
	24"-27"-30" 630-5	sold separately			front	front	front	front	front	rear	rear	rear	rear	4	3.9
WESTINGHOUSE	17"-21"-24" Catalina	alum.	auto.	18,250	top	top	top	top	top	rear	none	rear	none	3	4.0
ZENITH	21"-24" 17X	gray	auto.	14,000	front	top	top	top	top	top	inside	top	none	3	n.s.
	21"-24" 19X	alum.	auto.[b]	16,500	front	front	front	front	front	front	inside	front	none	3	n.s.
	21"-24"-27" 22X	alum.	magn.	20,000	front	front	front	front	front	front	front	front	none	3	n.s.

Specifications and price are for cheapest 21" VHF model using chassis indicated. Speaker data covers all models.
[a]Picture tube, damper, high voltage and power rectifiers are not included; [b]adjustable for best focus by service-

Copyrighted material

PICTURE STABILITY						PICTURE POWER				SPEAKERS AVAILABLE	POWER SUPPLY	PRICE
Automatic Gain Control		Noise Killer	Interference Filters	Antenna Pad	Intermediate Frequency	No. Tube Functions[a]	Sensitivity (microvolts)	Front End Type	No. Video Amp. Stages			
Type	Adjustment											
derived	local-dist.	no	FM trap	no	20	n.a.	50	cascode	1	one: 4"	transformer	$170
keyed	variable	yes	FM trap	no	20	n.a.	50	cascode	1	one: 4", 10" or 6" x 9"; two: 6" x 9"	transformer	$190
derived	none	no	n.a.	no	40	19	n.s.	cascode	1	n.a.	transformerless	$170
keyed	none	yes	high pass	no	40	23	n.s.	cascode	1	one: 4" x 6"; three: 3", 3" and 8"	transformer	$200
derived	local-dist.	no	high pass	no	40	19	n.s.	cascode	1	one: 5", 6", 8" or 6" x 9"; two: 5", 6" or 6" x 9"	transformerless	$170
derived	local-dist.	no	high pass	no	40	20	n.s.	cascode	1	one: 8"	transformerless	$290(24")
derived	none	no	band pass	n.a.	20	18	60	pentode	1	one: 4" or 5"	transformerless	$170
keyed	variable	yes	band pass	n.a.	40	21	35	cascode	1	one: 5¼" or 8" x 12"	transformerless	$200
keyed	variable	yes	band pass	n.a.	40	n.a.	15	cascode	2	two: 4" and 8" x 12"	transformer	n.a.
derived	variable	no	high pass & IF trap	no	40	23	n.s.	cascode	1	one: 4"	transformer	$190
derived	variable	no	high pass & IF trap	no	40	23	n.s.	cascode	1	one: 6", 8" or 10"; two: 6"	transformer	$210
keyed	variable	yes	high pass & IF trap	no	40	28	n.s.	cascode	2	one: 6", 8" or 10"; two: 3" and 10"	transformer	$260
derived	n.a.	no	n.a.	no	20	n.a.	n.a.	cascode	1	no speaker supplied	transformer	$200[d]
keyed	n.a.	no	n.a.	no	20	n.a.	n.a.	cascode	1	no speaker supplied	transformer	$230[d]
keyed	n.a.	no	n.a.	no	20	n.a.	n.a.	cascode	1	no speaker supplied	transformer	$300[d]
derived	none	no	IF trap	yes	40	20	n.s.	pentode	n.a.	one: 4" or 8"	transformerless	n.a.
derived	none	yes	IF trap	yes	40	22	n.s.	cascode	n.a.	one: 4", 5¼" or 8"; two: 8" and 10"	transformer	$180
derived	variable	yes	IF trap	n.a.	40	25	n.s.	cascode	n.a.	one: 8" or 10"; two: 8" and 10"	transformer	$260
derived	none	no	n.a.	no	40	18	n.a.	pentode	n.a.	one: 4"	transformerless	n.a.
derived	local-dist.	no	n.a.	no	40	19	n.a.	cascode	n.a.	one: 4" or 6"	transformerless[c]	n.a.
derived	local-dist.	no	n.a.	n.a.	40	21	n.a.	cascode	n.a.	one: 6"	transformerless	n.a.
derived	variable	no	n.a.	n.a.	40	n.a.	n.a.	pentode	n.a.	one to three: 4½"-12"	transformer	n.a.
derived	variable	no	n.a.	n.a.	40	n.a.	15-30	cascode	n.a.	one to three: 4½"-12"	transformer	$250
keyed	variable	no	n.a.	n.a.	40	n.a.	15-30	cascode	n.a.	one to three: 4½"-12"	transformer	n.a.
derived	local-dist.	no	3 IF traps	no	40	23	30	cascode	1	one: 5" or 12"; two: 5" and 12"	transformer	$150
keyed	none	no	3 IF traps	no	40	24	30	cascode	1	same	transformer	$250
keyed	local-dist.	no	3 IF traps	no	40	24	30	cascode	1	same	transformer	$300
keyed	none	yes	3 IF traps	no	40	n.a.	16	cascode	2	same	transformer	$450(27")
derived	none	no	none	no	20	n.a.	n.s.	pentode	1	one: 4" or 6"	transformerless	$140
derived	local-dist.	no	none	no	40	n.a.	n.s.	cascode	1	one: 4" x 6"; two: 4" x 6" and 6"	transformer	$190
derived	local-dist.	no	none	no	40	n.a.	n.s.	cascode	1	one: 4" x 6"; two: 4" x 6" and 6"	transformer	$190
derived	none	no	IF trap	no	40	18	n.s.	pentode	1	one: 4"	transformerless	$150
derived	none	no	IF trap	no	40	19	n.s.	pentode	1	one: 8"	transformerless	$190
derived	local-dist.	no	2 IF traps	no	40	19	n.s.	cascode	1	one: 5" or 8"	transformerless	$190
keyed	variable	no	2 IF traps	no	40	23	n.s.	cascode	2	two: 4" and 10"	transformer	$260
keyed	none	yes	IF trap	no	40	22	25	cascode	1	one: 8"	transformerless	$170
keyed	none	yes	IF & FM trap	yes	40	22	20	cascode	1	n.a.	transformerless[c]	$190
keyed	none	yes	IF & FM trap	yes	40	23	20	cascode	1	two: 5¼", 6", 8" or 6" x 9"	transformer	$230
derived	local-dist.	no	IF trap	no	40	21	n.s.	pentode	1	one: 4"	transformer	$160
derived	local-dist.	no	IF trap	no	40	20	n.s.	pentode	1	one: 4" or 6" x 9"	transformer	$190
keyed	none	no	IF trap	no	40	23	n.s.	cascode	1	one or two: 6" x 9"	transformer	$230
derived	none	no	none	none	40	n.a.	10	cascode	1	one: 5¼", 6" or 8"	transformer	$180
derived	local-dist.	yes	none	none	40	n.a.	10	cascode	1	one: 6" or 8"; two: 6" and 8" or 8" with electrostatic	transformer	$230
derived	local-dist.	yes	none	none	40	n.a.	10	cascode	2	one: 6"; two: 6" and 8"	transformer	$330
derived	local-dist.	no	none	no	20	19	25	cascode	1	one: 5"	transformerless	n.a.
keyed	variable	no	high pass	no	40	20	25	cascode	1	one: 5" or 6"; two: 4" and 10" or three: 4", 4", and 10"	transformerless[c]	n.a.
derived	variable	no	FM & 2 IF traps	no	40	20	n.s.	pentode	1	one: 4" or 8"	transformerless	$170
keyed	variable	yes	FM & 2 IF traps	no	40	24	n.s.	cascode	2	one: 5" or 8"; two: 8"	transformer	$200
keyed	variable	yes	FM & 2 IF traps	no	40	24	n.s.	cascode	2	two: 8"	transformer	$300
keyed	none	no	optional	n.a.	40	21	70	cascode	1	one: 5"; two: 4" and 6" x 9"	transformerless[c]	$165[d]
keyed	variable	no	optional	n.a.	40	21	70	cascode	1	two: 4" and 6" x 9" or 4" and 6"; three: 5", 5", 6" x 9"	transformerless[c]	$210[d]
derived	variable	yes	optional	no	40	n.a.	15	cascode	1	one: 4" x 6" or 8"	transformerless	$190
keyed	variable	yes	optional	no	40	n.a.	15	cascode	1	one: 10"; two: 4" and 8" or 4" and 10"	transformer	$260
derived	none	no	none	no	20	20	8	pentode	1	one: 4"	transformer	$130[d]
keyed	variable	no	none	no	20	30	4	cascode	2	one: 12"	transformer	$190[d]
keyed	variable	no	none	no	40	30	4	cascode	2	one: 12"	transformer	$250[d](24")
keyed	variable	no	IF trap	no	40	19	15-20	cascode	1	one: 5" or 10"	transformerless	$160
derived	local-dist.	yes	IF trap	no	40	19	n.s.	cascode	n.a.	one: 7½" or 10"; two: 3½", 5¼", 7½"	transformer	$180
keyed	variable	yes	IF trap	no	40	21	n.s.	cascode	n.a.	one: 7½" or 10"; two: 5¼" and 7½"	transformer	$220
keyed	variable	yes	IF trap	no	40	25	n.s.	cascode	n.a.	two: 3½" and 10"	transformer	$350

man; [c]tube filaments are transformer-fed and wired in parallel; [d]mail-order price excluding freight. NOTE: n.a. *means information not available at press time;* n.s. *means information not specified by manufacturer.*

Copyrighted material

NOVEL CABINET has chassis sitting on its end, lets it flop slowly forward for viewing. Telefold, developed by Robert W. Fuldner Associates, New York, can hold any chassis.

[*Continued from page 119*]

The swing is definitely to aluminized tubes. Their phosphor faces have an inner coating of aluminum, which acts as a mirror to reflect the light forward to the viewer. You see a picture four to seven times brighter.

The high voltage on the picture tube is also a good tip to the brightness you can expect. It varies quite a bit among '56 TVs. The higher the better.

Electrostatic focus—automatic—is also taking over the field. Tubes made to operate this way are self-focusing; they have no focus control. But since individual tubes vary, some sets offer the serviceman a choice of voltage connections for the focus electrode. He can choose the voltage that produces the sharpest focus when he is setting up a new set or replacing a picture tube.

You'll hear a lot about "90-degree" tubes. In them the electron beam is swung through a 90-degree angle instead of a 70-degree angle. The advantage is in cabinet-size—90-degree tubes are shorter and fit in a smaller box.

Controls. The only knobs staring at you on a '56 receiver are likely to be the channel selector and those for fine tuning and volume. This makes the set look easier for grandmotherly baby sitters to operate, and helps discourage the kids from fiddling with your carefully worked out adjustments.

For the kind of guy who likes a four-speed manual gearshift on his car, however, a few TVs have all kinds of auxiliary controls available (though concealed) near the screen.

Fringe-area TV. To give you a good picture from a weak signal, '56 TVs use:

• *Cascode tuners (most sets).* These have a specially designed tube with two sections connected so that amplification of the signal is high but noise (snow) from tube operation is low.

• *Automatic gain control (all sets).* AGC circuits sense the strength of the incoming signal and automatically adjust the amount of amplification so that a nearly constant signal reaches the picture tube.

The better "keyed" or "gated" AGC usually involves extra tubes and is more expensive to make. There are many different types, however, stepping up in performance from the simplest derived to the most complex keyed AGC.

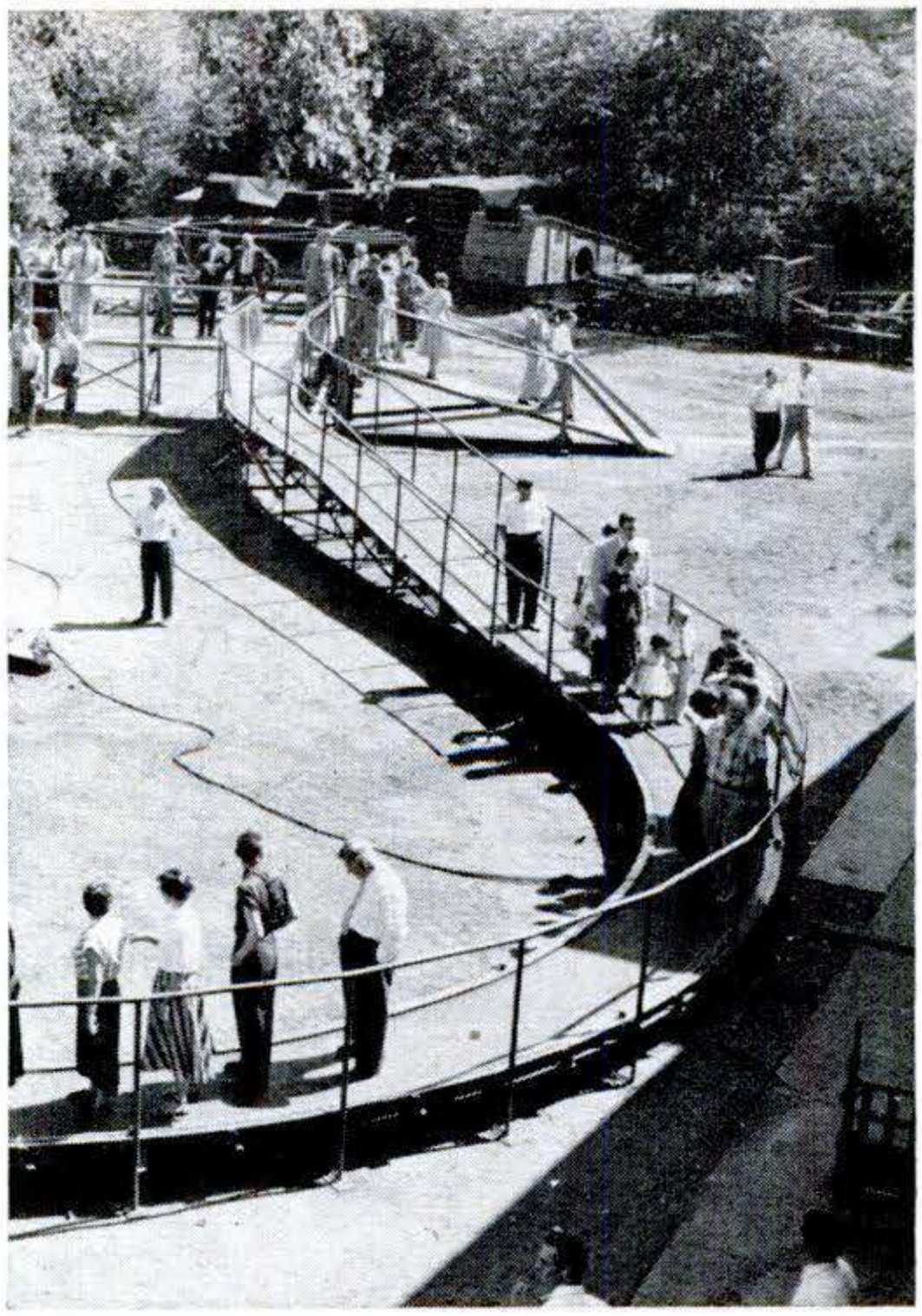
Some DuMonts and Capeharts, for example, add to keyed AGC a special video circuit that automatically provides the best possible picture for all signal conditions. On a strong signal, it uses less gain and more band width to provide sharpest detail. On a very weak signal it sacrifices some detail for higher amplification, to provide a picture.

Some sets are actually too sensitive for a strong local signal. Their AGC circuits cannot prevent the amplifiers from overloading and, paradoxically, causing a poor picture. To offset this, you will find that many sets have a manual AGC adjustment. Another method of preventing overload is to put an attenuating pad—a resistor network—in the antenna input. When switched into the circuit, this pad weakens the signal before it gets to the set proper.

• *Noise Killer.* A new circuit is showing up in a few of the quality sets. It is a "noise canceler" or "noise inverter," which ingeniously cancels static that may cause poor spacing of the lines (poor interlace) in the picture and a

[*Continued on page 250*]

Copyrighted material

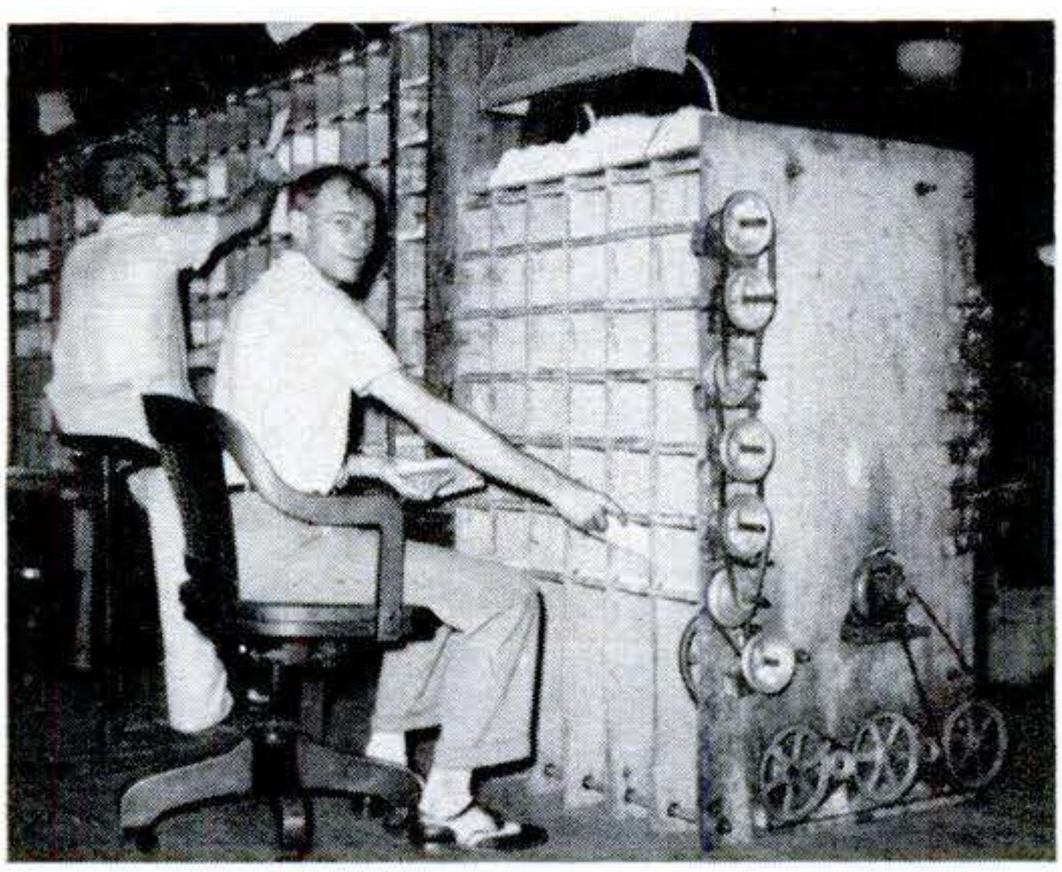


Moving Sidewalk Turns Corners

PASSENGERS ride around curves on this moving sidewalk developed by Hewitt-Robins, Inc., Passaic, N.J. A rubber carpet, fastened to wheeled pallets mounted on steel tracks, stretches on the outside and contracts on the inside as it makes a turn.

Peephole Screens Keep Out Sun

Rows of peephole sunshades will keep sun out of the eyes of tenants who relax on the balconies of these new apartment houses in the U.S. sector of West Berlin. They'll also screen occupants from neighbors but allow limited vision from the balcony.



Clerk Mechanizes Mail Sorting

THIS conveyor system devised by post office clerk G. S. Kester Jr. of Columbia, S.C., speeds his work and makes it a sit-down job. A single motor runs moving belts in the pigeon-holes to inch letters to the rear where they are scooped out by hand.

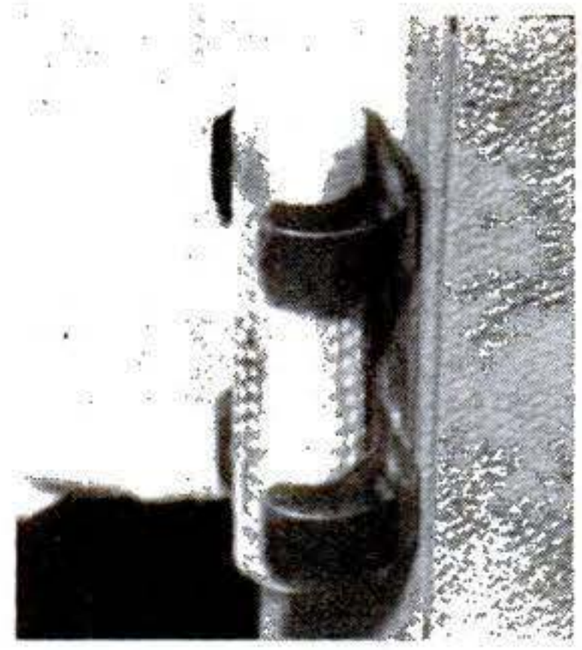
Helicopter De-Ices Phone Lines

A SPRING-LOADED bamboo pole, hitched to a helicopter, slaps ice off telephone lines to clear service for Pacific Telephone and Telegraph. Economy Pest Control of Yakima, Wash., uses as many as five copters to handle snow-ice control for the phone company.

Copyrighted material

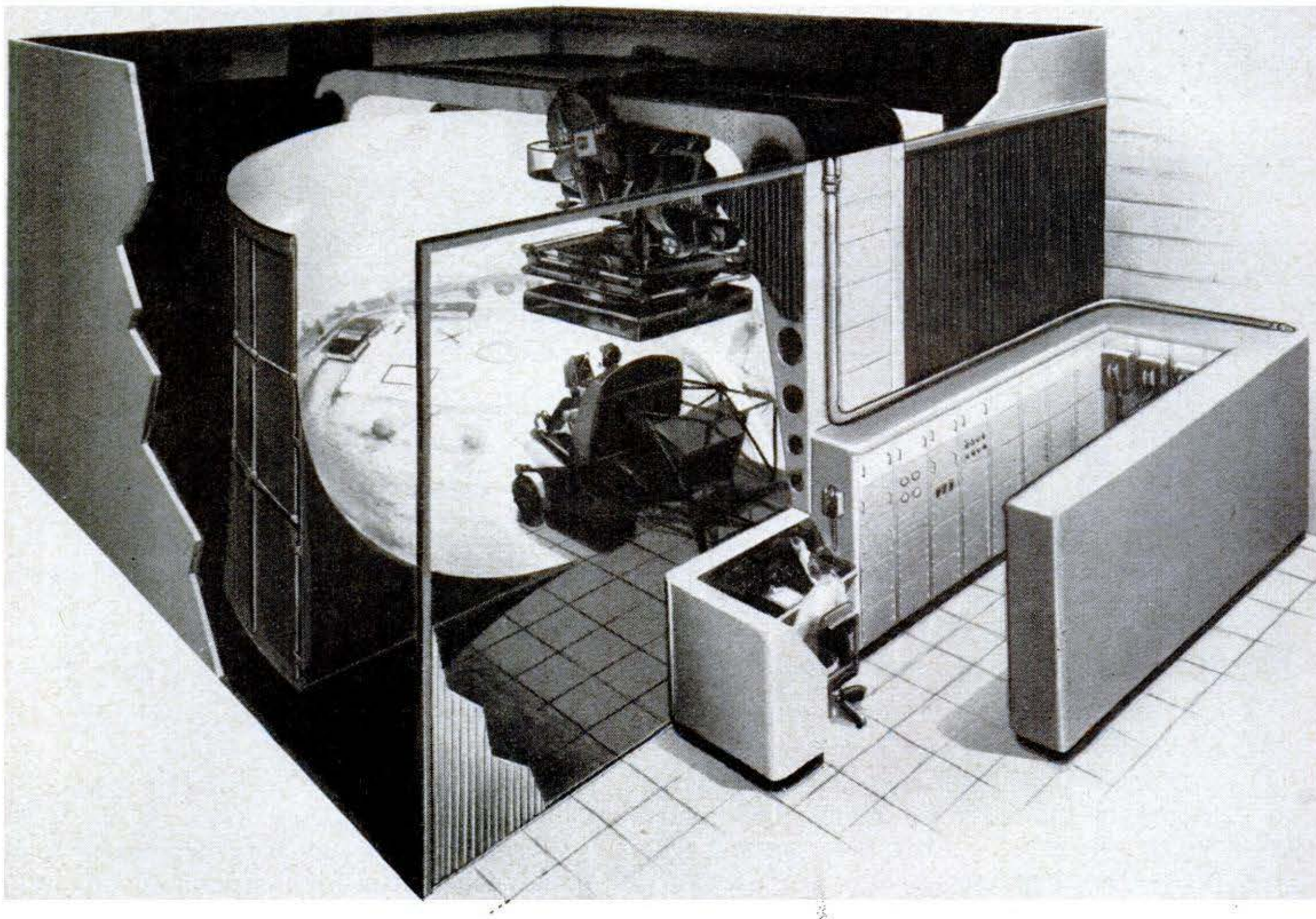
New in Aviation

Pilot shifts his weight to control this midget helicopter in flight. A flying test bed, the Kellett KH-15 was developed for the Navy to test a new gyro stabilizing device for rotor craft. Although the KH-15 is powered by rocket motors at the tips of its blade, the stabilizer can be used on any type of helicopter.

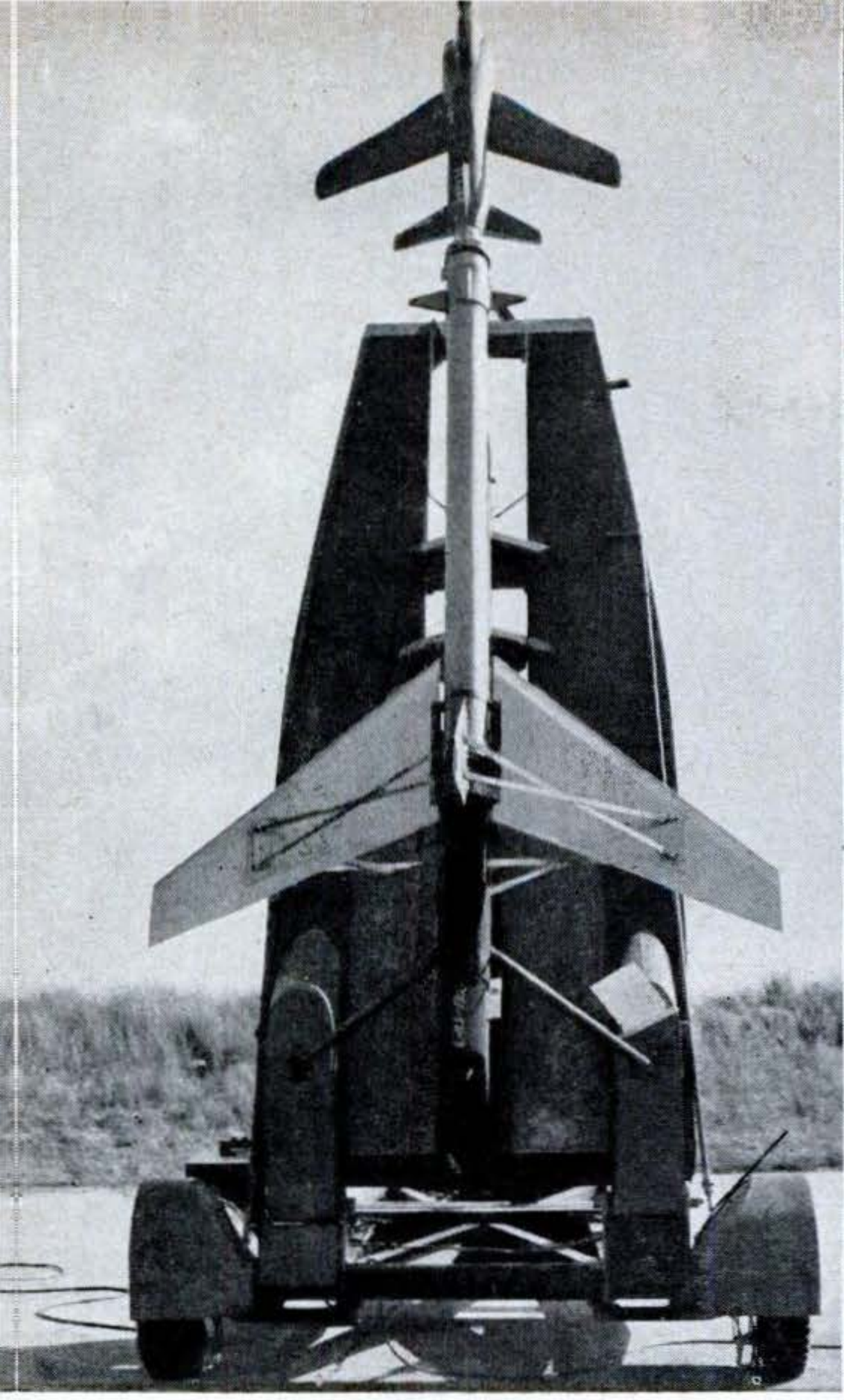


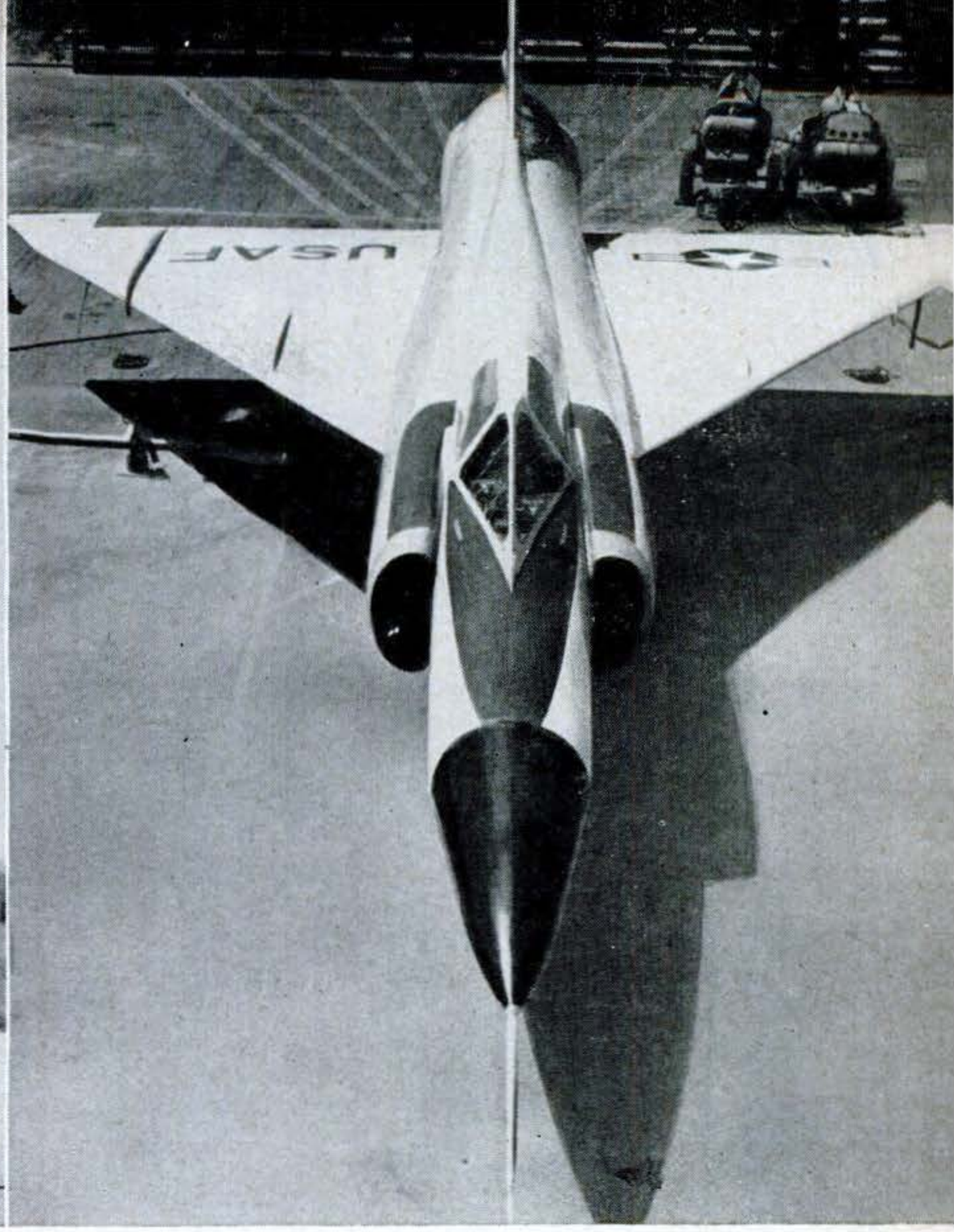
A tubelike device will enable cigar and pipe smokers to puff away in Swissair planes without annoying other passengers. The device (above), which is fastened to the seat, contains a chemical to eliminate tobacco and cooking odors and prevent air sickness.

Whirlybird "flight" inside a hangar is possible with this flight simulator, or trainer. Thus a pilot can master the tricky business of handling a helicopter without leaving the ground. Built by Bell Aircraft for the Navy, the device projects scenery as it would look from the air, and duplicates rotor noise, rough air, landing bumps.



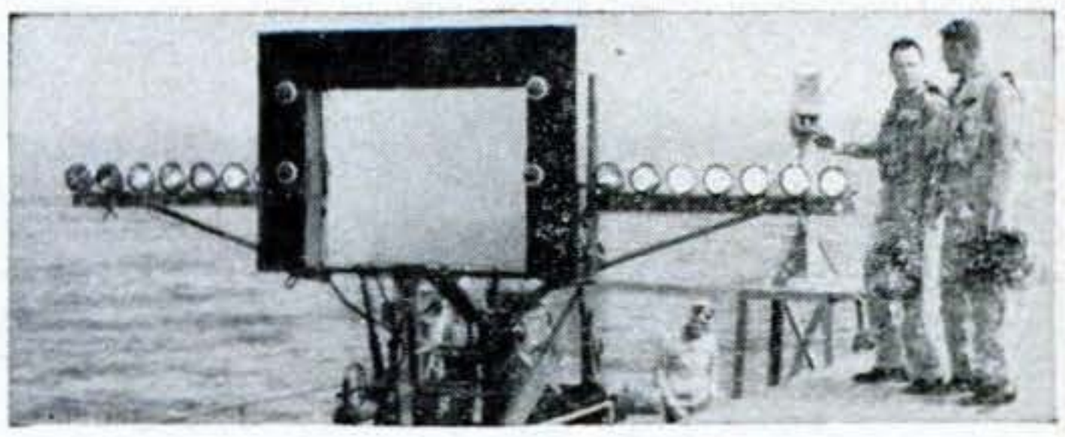
Copyrighted material



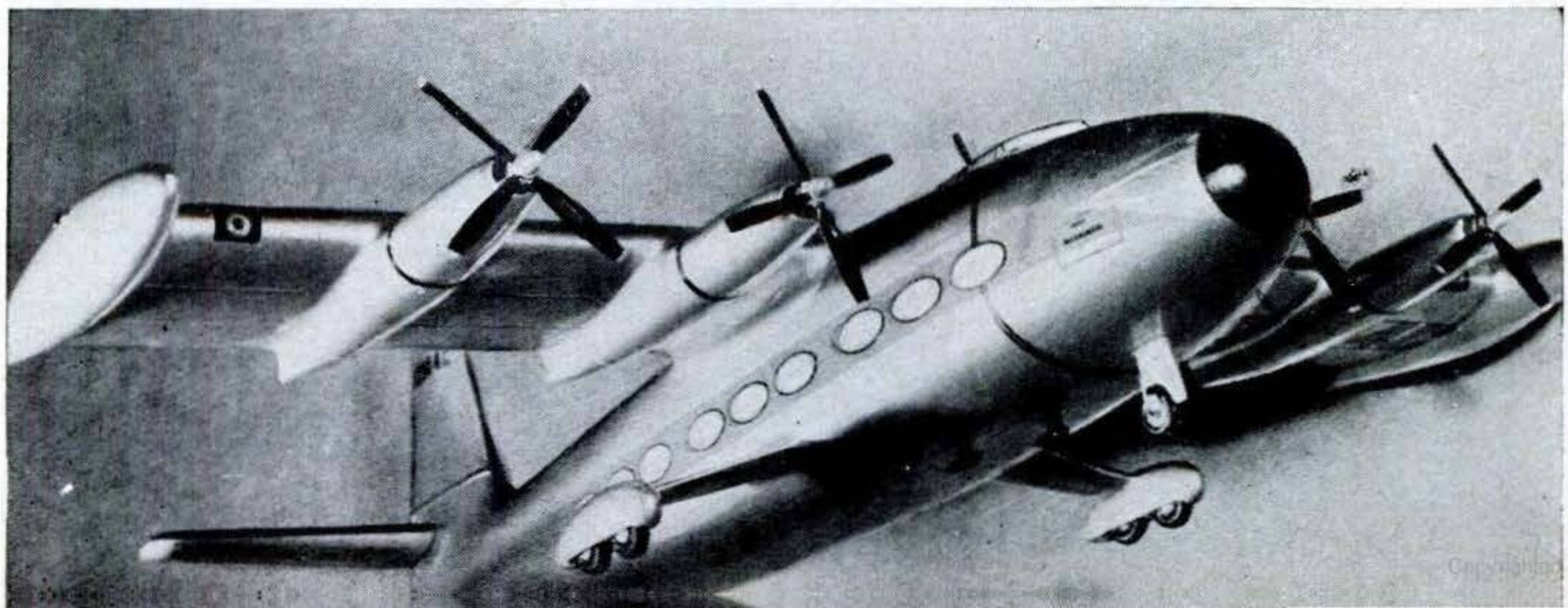


Pinch-waist design, shown in the Convair F-102 all-weather interceptor at right above, enables airplanes to go faster without increasing power. To study flight characteristics of the drag-reducing design, scientists of the National Advisory Committee for Aeronautics used a rocket booster (left) to get plane models up to supersonic speeds.

Mirror and lights guide pilots to safe aircraft-carrier landings. Borrowing from the British, the U.S. Navy is installing this landing system to replace the landing-signal officer. A concave mirror and banks of green and amber lights give the pilot his glide path and altitude in relation to the deck.



Tomorrow's workhorse of the air, to replace the veteran DC-3, may be this cargo and passenger plane being developed by Jack Frye, former head of TWA and a pioneer in air transportation. With a top speed of 170 miles an hour, it will be able to land at 55 miles an hour on unpaved airports. Landing gear will not retract in flight.



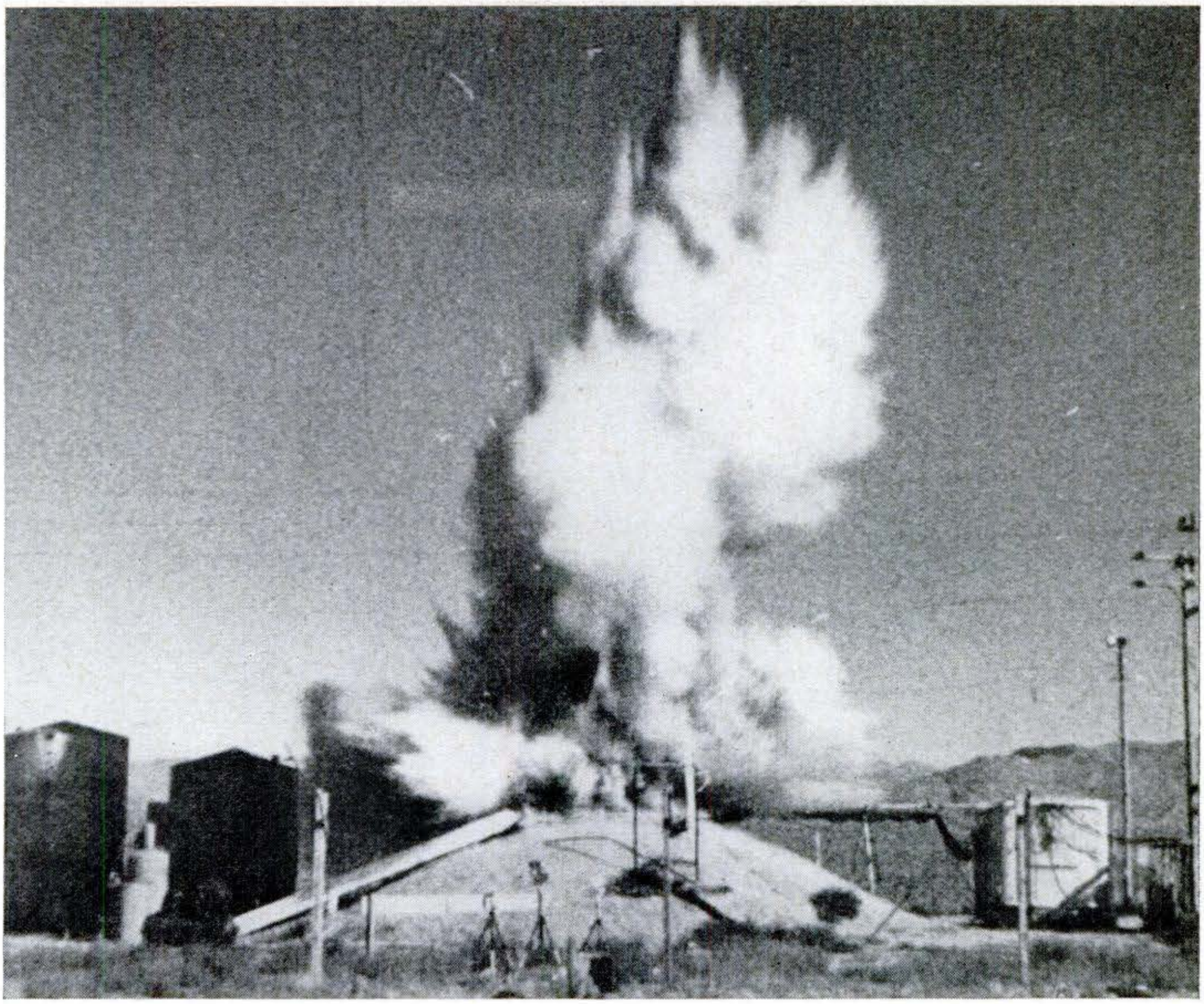
Copyrighted material

Power Carts Fire Up Jets

Blasts of compressed air from twin gas-turbine units now start the eight powerful engines of the B-52 heavy jet bomber. The small Boeing 502 gas-turbine engines, each with two exhaust stacks, as seen in the photo at right, are mounted on a mobile cart along with a fuel tank. Flexible ducts carry the compressed air to the engines.

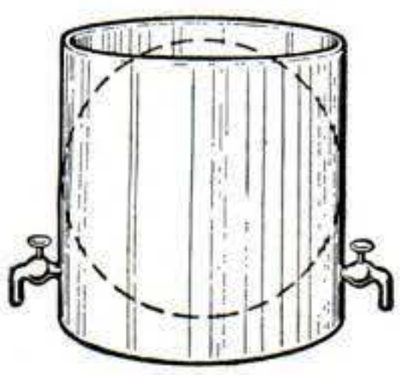
Direct power from a gasoline engine, through a hydraulic torque converter, spins jets into life in this North American Aviation unit. The streamlined starter, resembling a sleek sports car, also serves as a tow truck for the F-100 Super Sabrejet below that it is going to fire up. The low-slung vehicle has four-wheel drive and four-wheel steering, and can be driven directly underneath a plane to start a jet engine in 14 seconds.

Copyrighted material

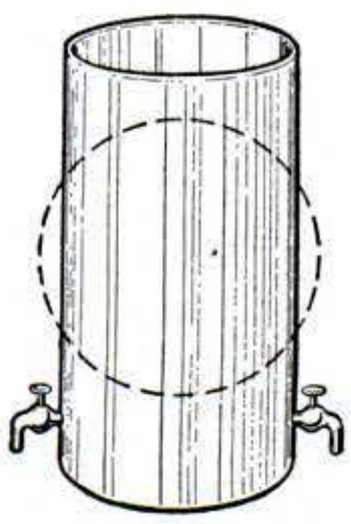


RUNAWAY CHAIN REACTION, staged for safety study, blows up reactor at Arco, Idaho, as output reaches fantastic 13,000,000 hp. Loud detonation spews smoke and radioactive debris.

CRITICAL AMOUNT OF U-235 solution, symbolized at left, undergoes a spontaneous and explosive chain reaction if it is allowed to come together in the most compact shape, that of a sphere.



UNSAFE TANK at left has enough room to contain a sphere of the size above. Therefore, filling this tank with U-235 solution would result in a disastrous, runaway chain reaction.



"GEOMETRICALLY SAFE" TANK has same capacity as tank above. But slimmer shape keeps U-235 solution from forming explosive sphere (dotted outline), and holds it in safely extended form.

Lanky Tanks Avert A-Blast

AN EXPLOSION like the one above is a novel hazard faced by designers of a plant to reclaim costly uranium 235 from a reactor's spent fuel rods. For a solution of U-235 spontaneously undergoes a runaway chain reaction, just as the solid metal does, if a critical amount comes closely together.

So "geometrically safe" shapes have to be used for tanks and chemical vessels handling U-235 solutions at the Chemical Processing Plant of the National Reactor Testing Station, Arco, Idaho, an official report reveals. An elongated design makes it impossible for a critical quantity of the liquid to assume a compact and dangerous spherical form (left).

Copyrighted material

OUTDOING THE INDIANS, Ross Taylor here fires a flaming arrow from his special compressed-air gun, accurate to 300 yards. It loads three at a time, their tips wrapped in oakum soaked in rubber cement and benzol. A metal disk at each arrow's tip protects the flame in flight.

He's Hollywood's Kindest Killer

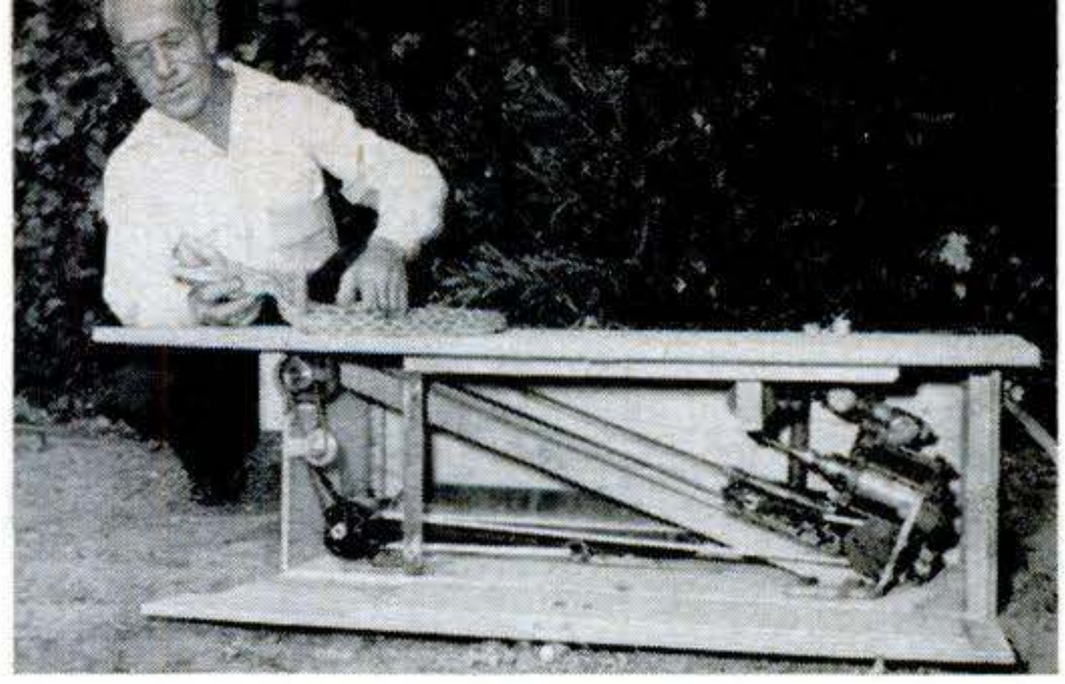
A 12-SHOOTER AIR GUN (left), Taylor's first trick weapon, fires ball bearings for bullets, to smash lights, mirrors or windowpanes. It also shoots gelatin capsules of red dye (to look like blood), powder, dust (to spurt up around an actor and make it appear that he is being bracketed by bullets) or Vaseline thinned with oil and containing a round black patch of film paper to make an apparent bullet hole (right) and surprisingly realistic crack patterns on flat glass surfaces.

Copyrighted material

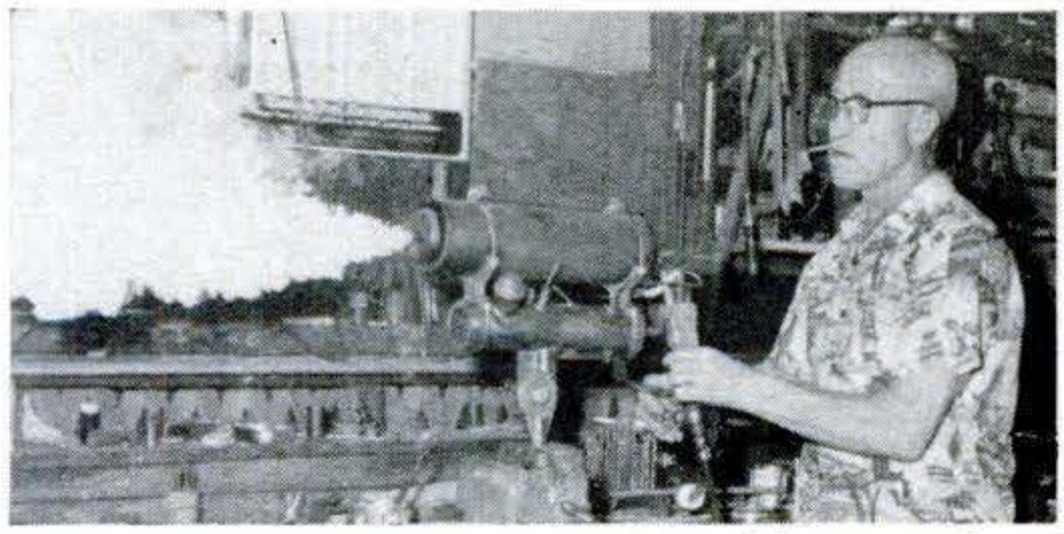
WHEN a movie director wants an actor killed—for plot purposes, you understand—he often selects a weapon from the private armory of Ross Taylor, one of the most gentlemanly, mild-mannered men in Hollywood.

It was mechanical ingenuity and not bloodthirstiness that led Taylor to create better means for shooting arrows, hurling knives and felling people with bullets than the films had had before. Now he has enlarged his battery of safe but lethal-looking weapons to include a mechanical rattlesnake that strikes like its poisonous namesake, and a gun that fires clouds of smoke at the press of its trigger —for asphyxiation or arson, if the script demands it.

Taylor, a former auto mechanic and carpenter, is a special-effects maker for Columbia Pictures Corp. His weapons, all built in his home workshop in North Hollywood, are a lucrative sideline. He rents them to any studio that needs them, for $7.50 a day per weapon, or $35 a week.—*Wesley S. Griswold.*



UNDER A COILED RATTLESNAKE made of rubber lie a fat air motor (at right, above) and lazy tongs, which make it uncoil and strike, and a sewing-machine motor (left) and pulleys that make its tail wiggle. The box is latched shut and buried when the rattler is to be in a movie.

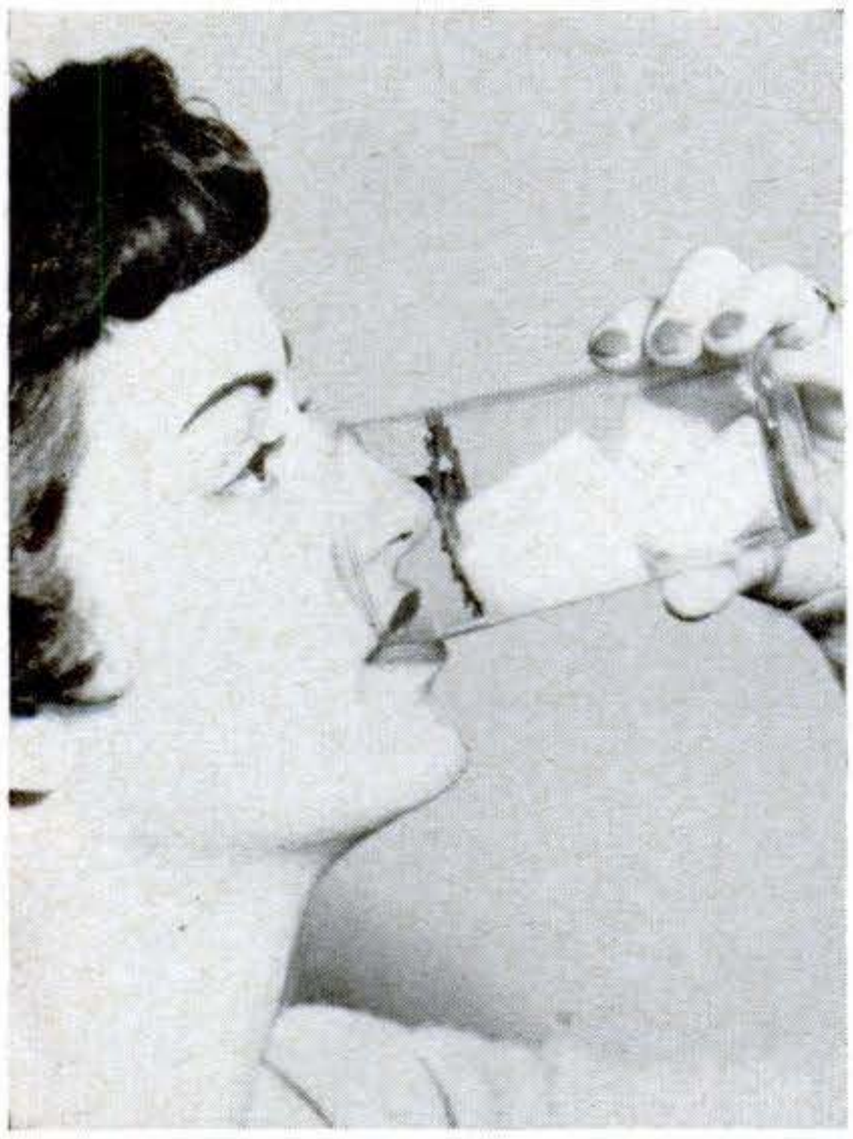


TAYLOR'S SMOKE GUN sprays cold mineral oil under 20-to-40-lb. pressure into a tube electrically heated to 750 degrees F. This instantly creates a thick white vapor, easy to breathe and only slightly odorous. The tube never contains enough oxygen to let the oil ignite.

FOR A THRILLING KNIFE "THROW," Taylor has provided a rectangular-barreled air gun (below), which he is aiming here. Out of camera range, he fires a short-bladed knife at the "victim," protected by a hidden chest pad, the instant that the knife-wielder appears to let fly.

Copyrighted material

New for Modern Living



1 Ice stoppers keep ice cubes from banging you—and your guests—on the nose when the glass is tipped up for that final sip. Made of colorful, anodized aluminum, the stopper clips inside any glass and holds such things as cubes and fruit away from the lips. A set includes eight colors.

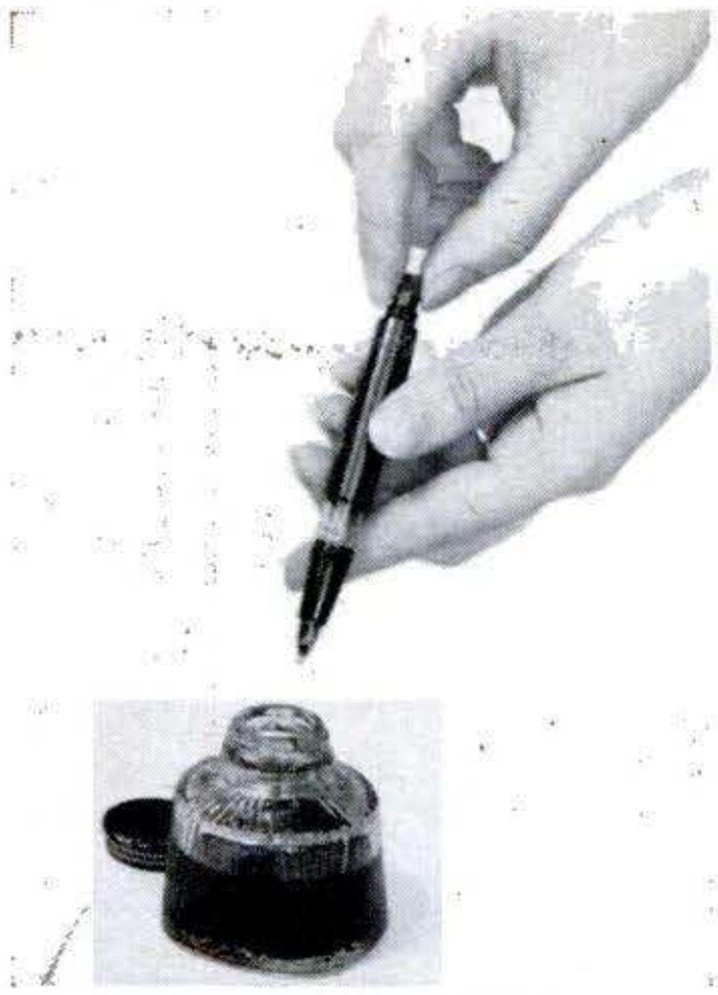
2 Flying saucers fly over snow. Down-to-earth facts show that Sno Coasters are of one-piece 16-gauge aluminum, measure 27 inches across and weigh in at 3½ pounds—about half the weight of a small sled. To operate, grab the two double-riveted handle loops of webbing, shift your weight and you're off—spinning down a snowy slope. Reinforced holes provide tow-rope hook-ons. The saucer won't rust, and Pop will never have to paint it.

3 Music fills the house, drifting through the ducts with the warm or cool air, when you have Registered Music attached to the central system. The case houses a volume control and a speaker. Hooking it up to your radio, TV or record player and mounting it on the heating or cooling unit requires no special tools or skill.

Further information about the products described on these pages can be obtained from: 1. Larsans, 4238 Harwood Ave., Cleveland 21; 2. Aluminum Goods Mfg. Co., Manitowoc, Wis.; 3. Kodiak Corp., 3515 Prospect Ave., Cleveland 15; 4. Imperial Sea-Way Products, 1446 W. Flournoy St., Chicago 7; 5. Orchard Trading Post, Box 151, Skokie, Ill.; 6. A. Schreter & Sons Co., 16 S. Eutaw St., Baltimore 1; 7. Brown-Forman Industries, 1908 Howard St., Louisville, Ky.; 8. Drink-Up Co., 1141 Broadway, NYC 1.

Copyrighted material

4 Nut meats come out whole, even with tough Brazil nuts and hazelnuts, when you use this tool, says its maker. Smaller jaws on the handles of the Paranac nutcracker take small nuts and crack ice cubes as well. The gadget is also handy for removing bottle caps.



5 No refill cartridges are necessary for this ball-point pen. Ordinary fountain-pen ink, which flows freely into the ball point, can be used to replenish the supply. Ink is admitted by turning a knob concealed in the top of the pen. A transparent barrel section shows ink level.

6 Built-in clasps are now standard equipment on some higher-priced neckties. You make the knot as usual, slip the narrow end with the clasp through a loop under the wide end, then hook the clasp to your shirt. For decoration, you can slide the clasp up where it will show.

7 Speedy photo chemicals in this setup whip film from developer through wash in seven minutes. All steps take place in the seven removable cups of a lightproof, water-jacket tank. Film (35 mm. to 620) on the reel is fitted into a turret on the revolving lid. An agitating rod dips film in and out of each cup. Floating lids seal chemicals in cups for future use.

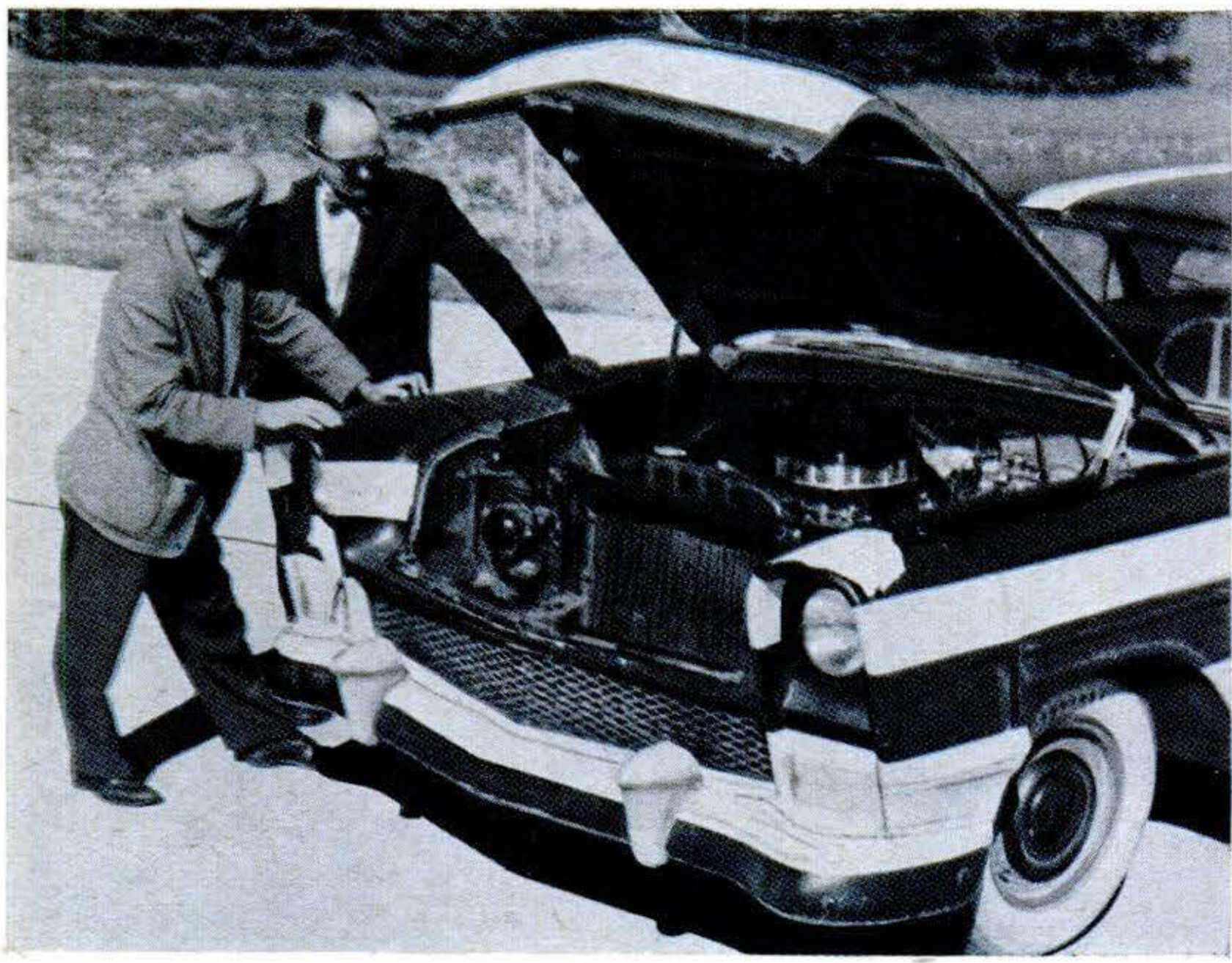
8 A reservoir in the base of this planter holds a supply of water (and plant food, if desired) which is absorbed by the soil as it is needed. When plant-watering time comes around, you moisten the soil as usual, then fill the reservoir with an extra supply. A feeding wick running from the flowerpot into the base transmits the water to the plant as the soil begins to dry out.

Copyrighted material

Chevvy Climbs to 205 Horsepower

The sport sedan is

Compression



STRIPED HYBRID at left is '56 machinery disguised by gooked-up '56 body. Idea was to keep public from learning what new models looked like when car made its record run up Pike's Peak in September. That air cleaner was lifted from a Corvette; the standard power-pack cleaner, like last year's, has a snout forward. Performance is the same with either.

FOR 1956, Chevrolet continues on its performance kick. Its looks are only lightly face-lifted. Its chassis changes are virtually nil. But under the hood on the top-output version is a 205-hp. V-8, which is currently the highest-rated engine in the field. How they pushed the horsepower up from last year's 180 is an interesting story.

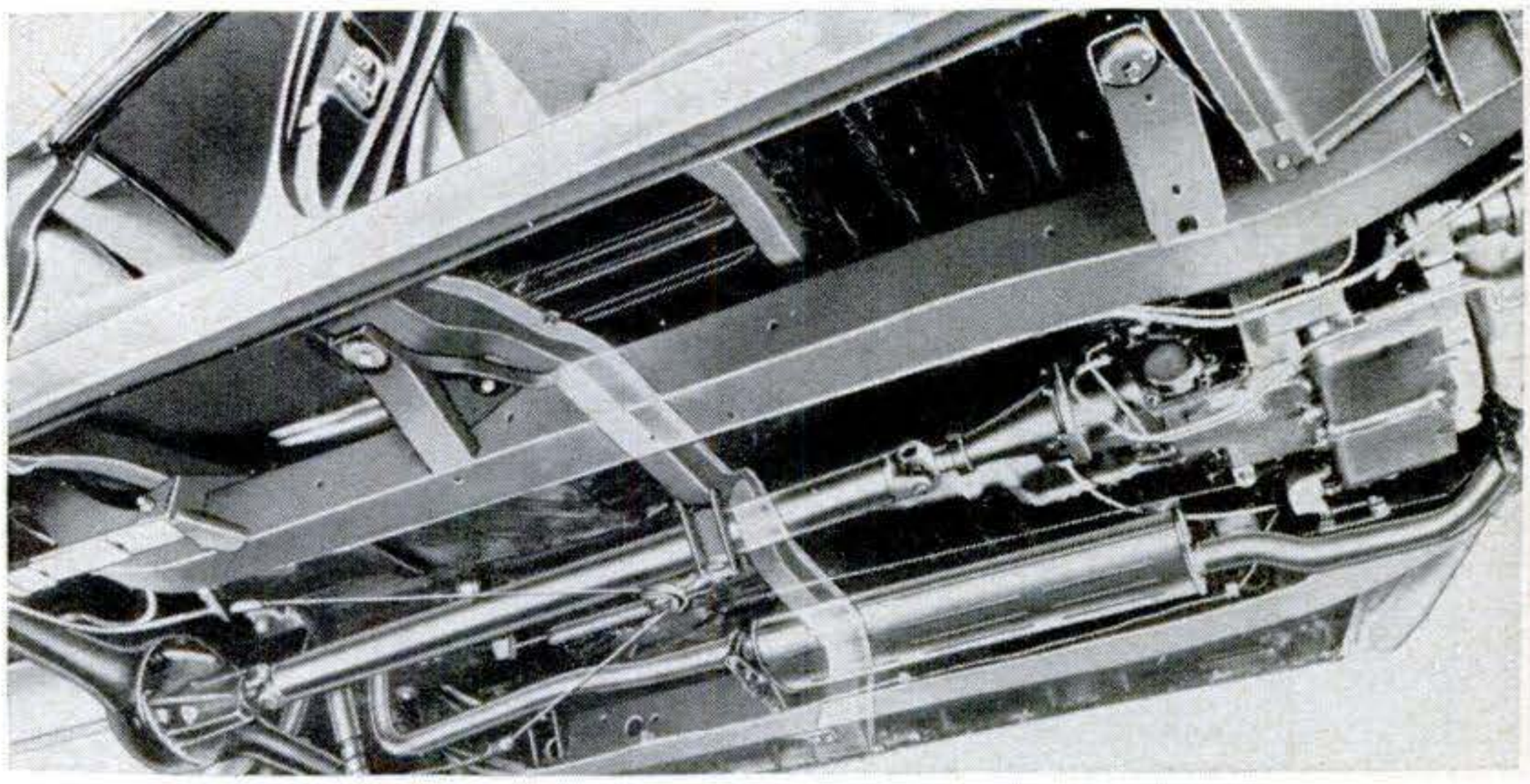
Power pack. The new top-dog Chevvy engine, like its 1955 equivalent, is a short-stroke power plant with a displacement of 265 cubic inches. As before, it has a four-barrel carburetor and dual exhausts. There are two main differences: a new, high-lift camshaft, and an increase in compression ratio from 8:1 to 9.25:1. The 205-hp. rating is achieved at 4,600 r.p.m., the same as last year. Torque is also increased, but relatively less, going from 260 to 268 pound-feet.

Basic V-8. For the bread-and-butter sales, to buyers who aren't performance-happy, there are two standard eights in Chevrolet's line for '56. One, rated at 170 horsepower at 4,400, is for use only with the Powerglide transmission. The other, pegged at 162 horsepower, pairs with overdrive and plain synchromesh transmissions. The torque, 257 pound-feet, is identical on both engines. Each has 8:1 compression, a two-barrel carburetor, and a single exhaust system. The chief difference lies in the camshaft: The

Copyrighted material

expected to be a hit, combining pillar-less visibility with the convenience of four doors.

and camshaft push up power-pack output, and there's a four-door hardtop for sporty types.



PROBLEM: How do you get center-post rigidity on a four-door hardtop if you cut away the anchorage to the roof? The answer is that you don't get the stiffness of a regular sedan. But deflection is held within acceptable limits by an extra bracing member shown in phantom at the right. There is also a heavy brace above floor at side of the amputated post.

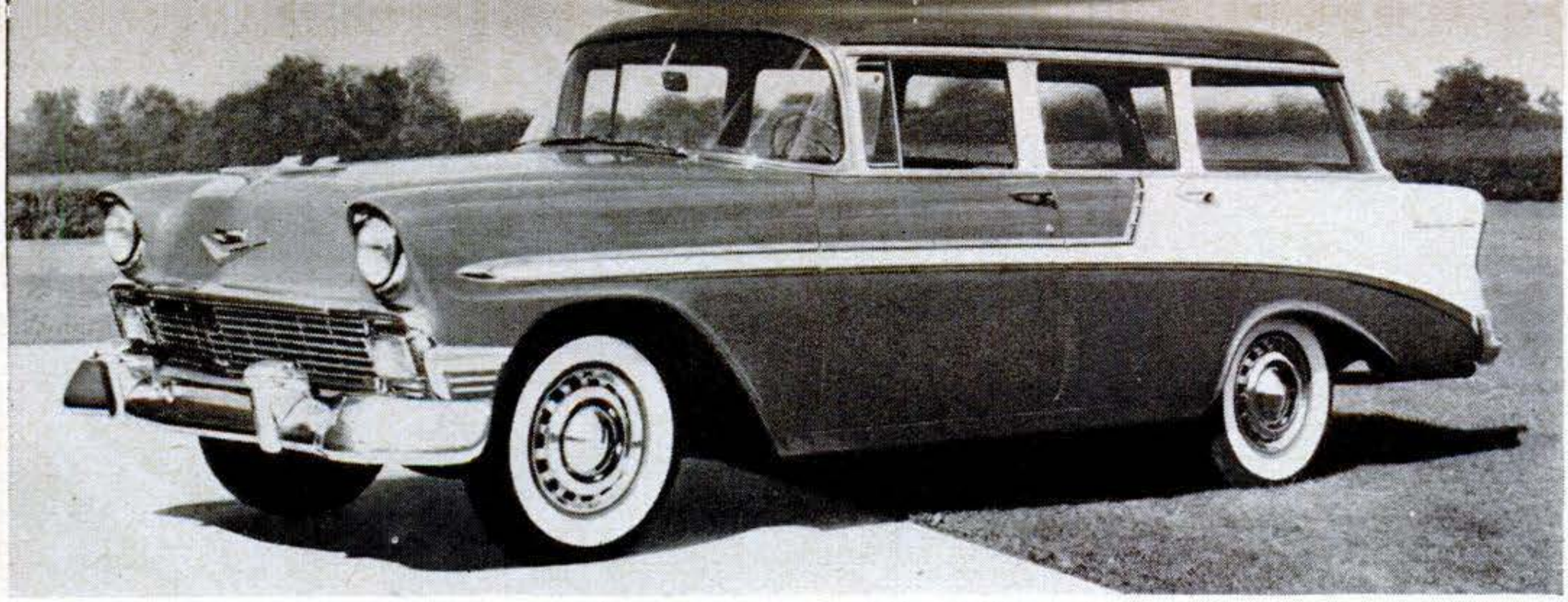
170-hp. job carries the high-lift cam and the other one does not. There is also a minor difference in the spark-advance curve in the distributor, to match the different transmissions.

Old Reliable. There is only one six-cylinder version for '56, for any transmission. The displacement remains at 235.5 cubic inches, but compression has been nudged up from 7.5:1 to 8:1. The engine also has its own version of the new camshaft. The ratings are 140 hp. and 210 pound-feet.

Other changes on Chevrolet engines are minor. The V-8s now come with a full-flow oil filter, tucked down on the left flank of the block, rather than with a partial-flow job perched up high in front. A power-pack V-8 that is ordered with a manual transmission now comes with a special heavy-duty clutch, borrowed from the truck line, to take the roughing-up that a performance-minded customer is likely to give it. The generator mounting has been beefed up to take out troublesome noise. And hydraulic valve lifters are now standard on all engines, in place of the solid lifters that were previously fitted to three-speed cars.

Chevvy engineers are a little sensitive to questions about this lifter change, partly because the solid-lifter engines won a reputation for clatter in '55, and

Copyrighted material

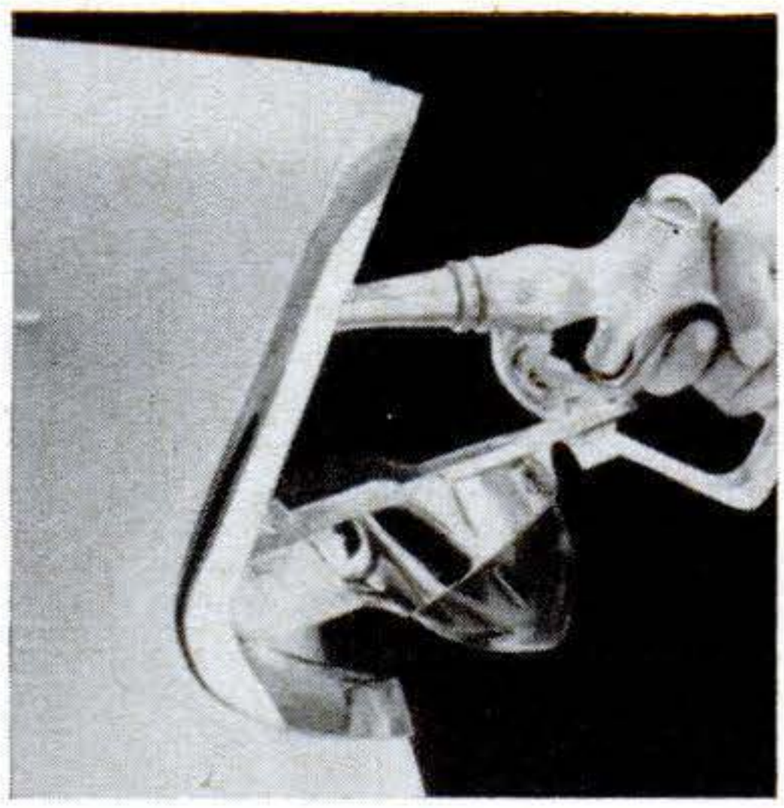


NINE-PASSENGER WAGON is new. The seat in the back can be plucked out and the one in middle folded for cargo carrying. Access to the rear seat is past a fold-down middle seat.

partly because hydraulic ones aren't beloved by high-performance customers. The engineers take pains to spell out two points:

1. Exacting manufacturing controls are making hydraulic lifters much better performers than they were a few years back, when lifter "pump-up" could occur as low as 4,500 r.p.m. This speed ceiling has now been pushed up to where run-of-the-assembly-line lifters will tolerate 5,200 to 5,300 revs, and a selected set can go to 5,500.

2. If, despite such assurances, a prospective customer stubbornly insists, he can have Corvette-type solid lifters on request.



JIMMY VALENTINES may be needed to work gas-cap combinations of new cars. Chevvy combination: Twist trim just above left stop light.

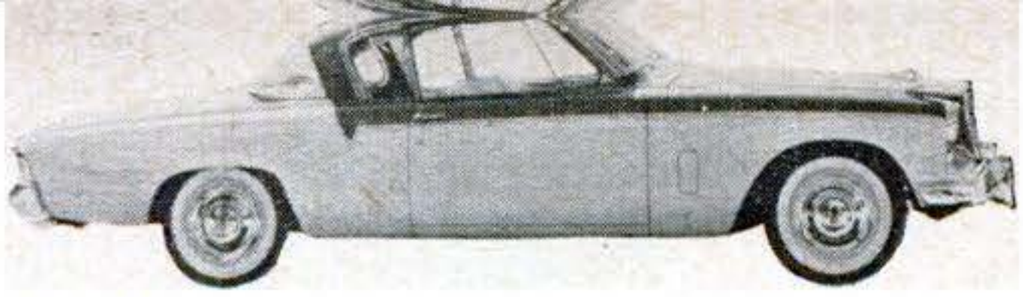
Performance. The only '56 job that was available five weeks before announcement was a beat-up car that Zora Arkus-Duntov had used in setting a record up Pike's Peak. It had a standard shift, hydraulic lifters and a slightly tired clutch that was not the new heavy-duty type. Pulling a fifth wheel to give correct speed, it delivered zero-to-60 runs of from 11.4 to 11.9 seconds (the variation being attributable to the sick clutch). The fifth wheel, incidentally, underlined the worthlessness of casual speedometer-clocked runs: Judged by the speedometer alone, the car made a 9.9-second run.

This performance is a whisker better than last year's, which was very good indeed. The short-stroke engine doesn't threaten to blow its buttons if you wind it up to 5,500 r.p.m., well beyond the peak. This means that on a zero-to-60 acceleration with this axle, you can forget about shifting to high. Although performance is showy, Chevvy may not in '56 have things all its way. Ford for one has the benefit of far more cubic inches and, on automatic-transmission models, a box that can give one extra gear change.

Safety latches, belts. Foxy as always, Chevrolet stole a march by inconspicuously introducing "anti-fly-open" door latches as a running change in June and July of 1955. The new models now offer either safety belts or shoulder harnesses as extras, as well as dash padding. The steering wheel has not been changed from its '55 configuration.

Sport sedan. New this year is a four-door hardtop, with no center pillar in the window area. Extra bracing stiffens the half-height post on which the rear door hinges and the front door latches. It comes in both the flossy Bel Air and middle-brow 210 series. Another '56 development is the introduction of a nine-passenger wagon.—*Frank Rowsome Jr.*

Copyrighted material



You'll Hardly Know the New Studebakers

New lines, a new engine and a theatrical new bomb are the '56 wares.

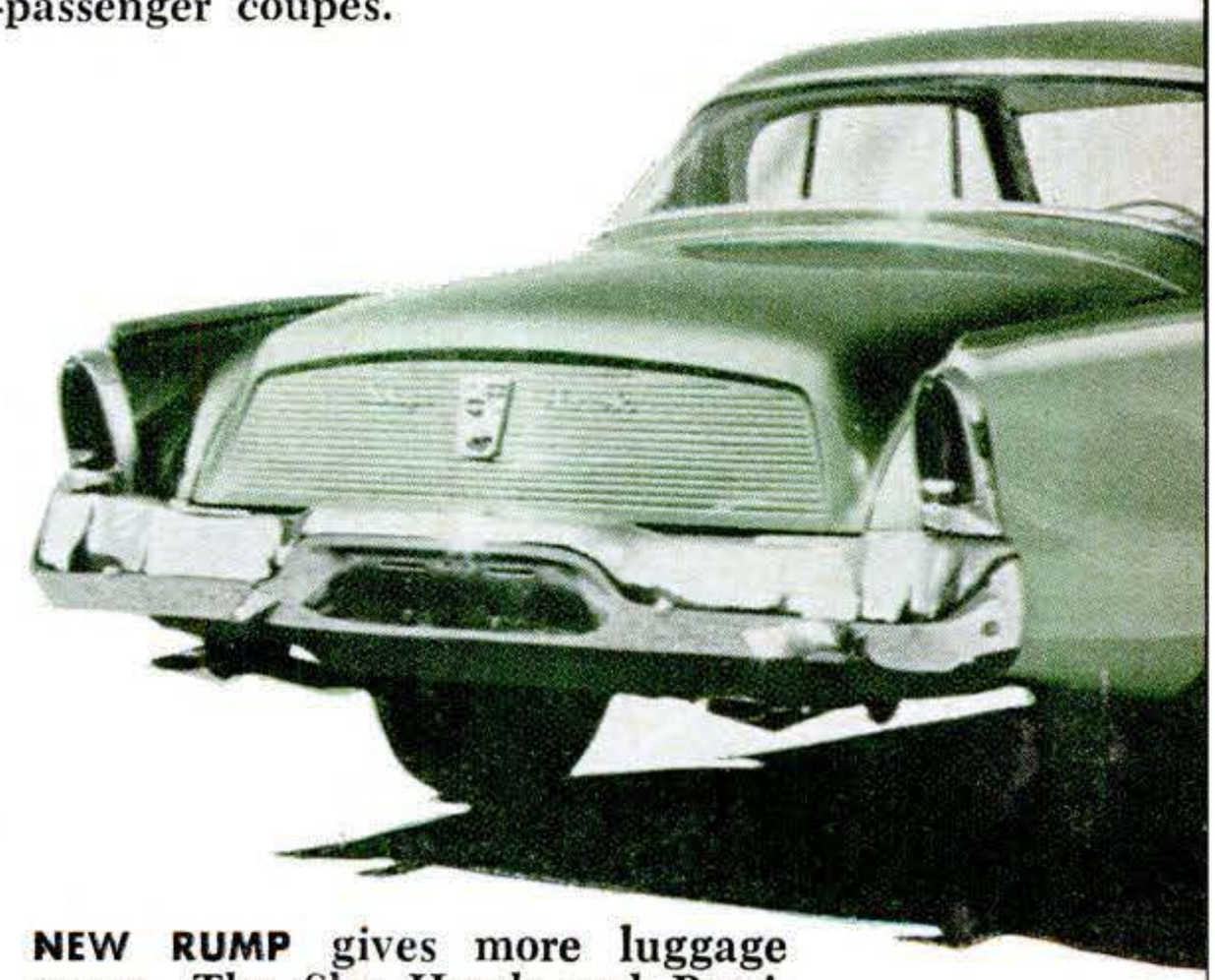
NEW NOSE reminiscent of Italian school marks the Hawk line of low-silhouette five-passenger coupes.

By FRANK ROWSOME JR.

PRACTICALLY everyone, it has been morosely noted in South Bend, likes Studebaker in principle. A little company struggling with giants, it has a proud history of engineering quality and innovation. Lately it has offered some of the slinkiest cars ever to turn up in U.S. salesrooms. But this academic approval has not been widely translated into twitches of the check-writing fingers.

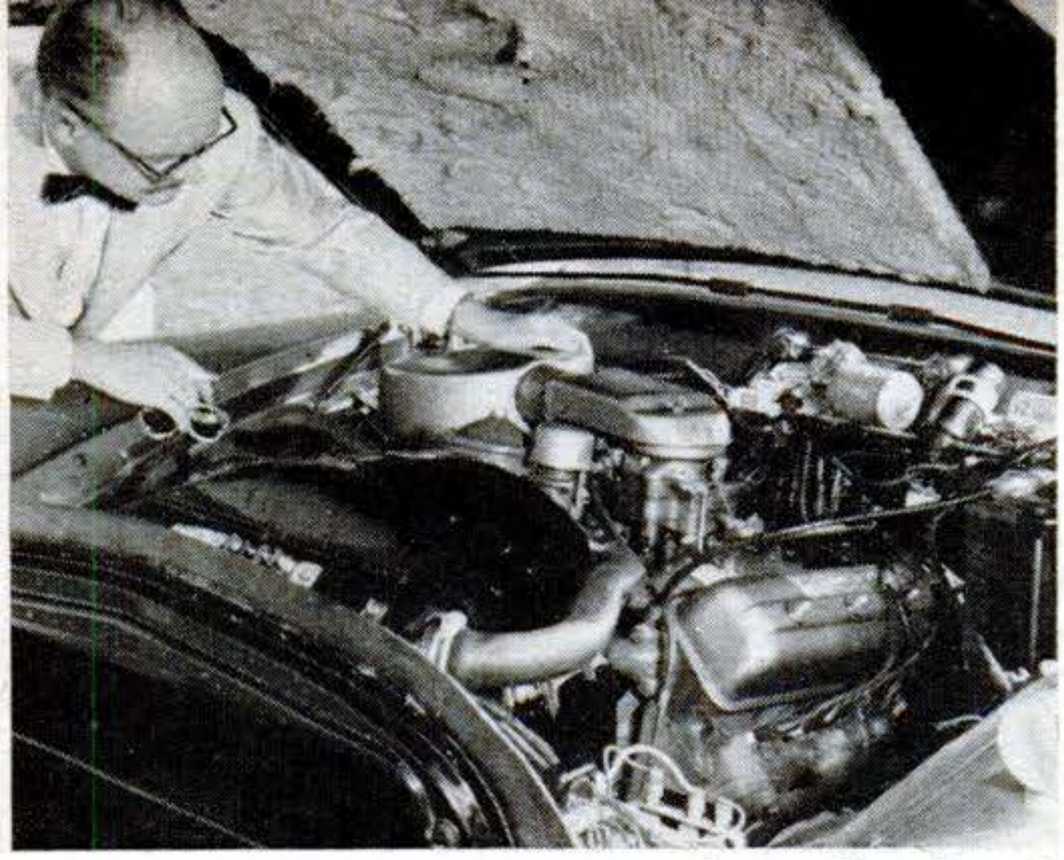
The '56 jobs have been recalculated to correct this behavior:

- The slopey, Loewy-designed coupe is

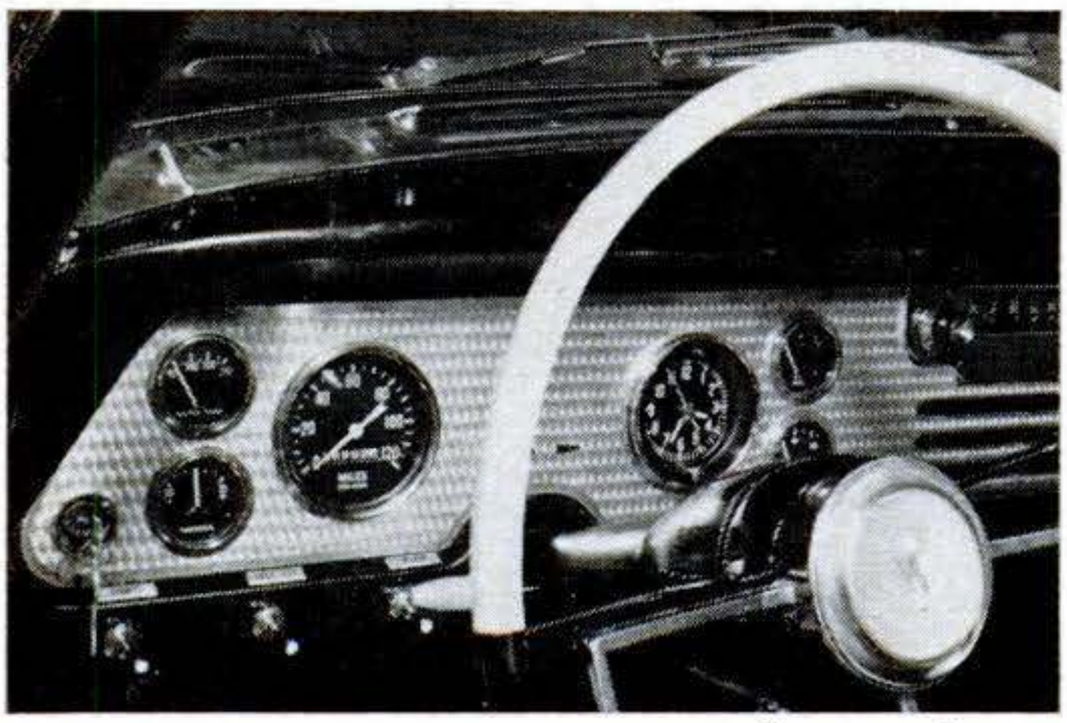


NEW RUMP gives more luggage space. The Sky Hawk and Presidents get the new 289-inch V-8.

Copyrighted material



HEADROOM IS A HEADACHE with that low hood, but on Studebaker-powered Hawks, engine accessibility is better than on some competitors. Blanket is offset to clear new 12-volt battery.



NO-NONSENSE GAUGES come on the Hawks, in contrast to winking lights and moving lines on sedans. Studebaker figures that the buyer of a low-silhouette car likes instrumentation.

no more. In its place is a different, though still highly sexy, line of low-silhouette coupes called the Hawks. In ascending order of dazzle they are called the Flight Hawk, Power Hawk and Sky Hawk.

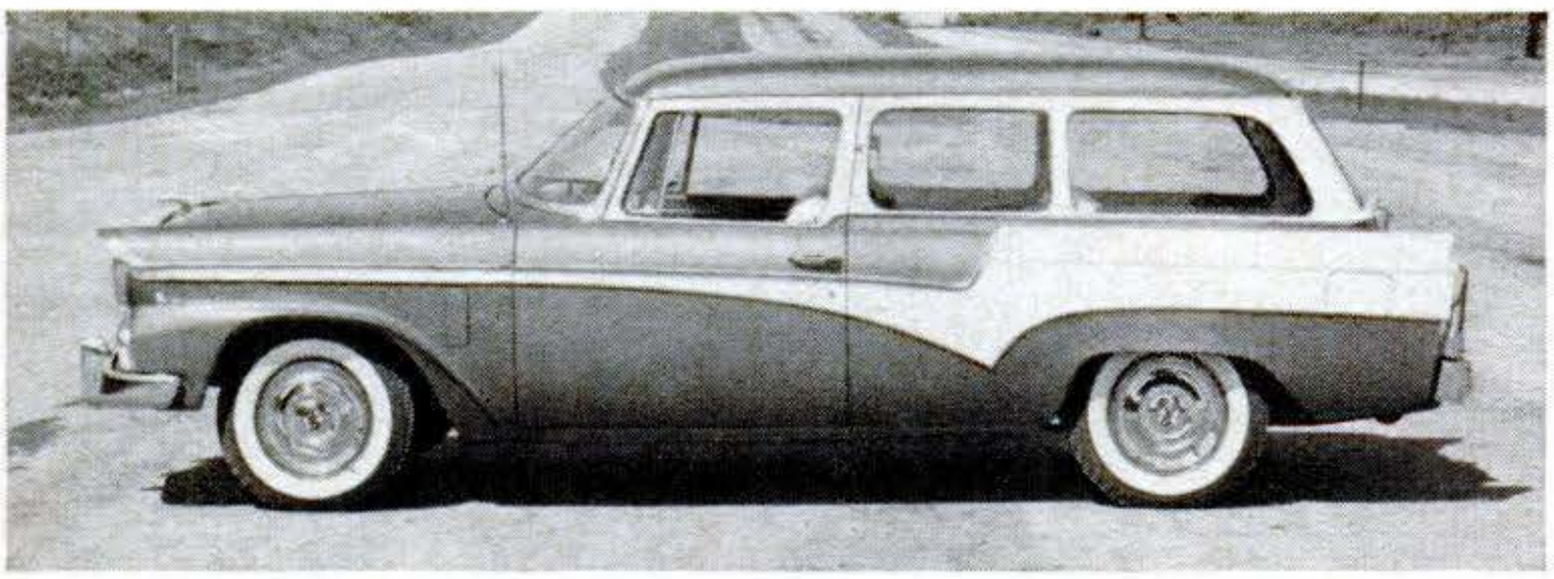
• Sedans have new rectangular lines, reminiscent of several successful competitors. The design replaces one that attempted to pair the hardtop's slinkiness with sedan proportions, and that didn't hit the bull's-eye. The '56 sedans promise to be more popular.

• Wagons, now strong medicine in the big suburban trade, have been expanded from the lone Conestoga of the past to three new ones. They are, in ascending order of glory, the Pelham, Parkview and Pinehurst. (Buyers not sharp at this model-christening caper are going to insert Ford's new Parklane wagon here.)

• In the machinery department, Studebaker offers such additional enticements as a new V-8 that is 30 cubic inches larger, an improved ride, better brakes, new safety door latches, a new automatic transmission, and enough optional assists to coddle a driver enfeebled to the point of collapse.

• Then there's an ace up the sleeve: the Golden Hawk. This is a limited-production special, even creamier than the other Hawks, that has a monstrous 352-cubic-inch Packard engine shoehorned under the hood. With some 275 hp. to urge a comparatively light car, its acceleration and top speed will peel the smug smirk off many a Thunderbird owner's face.

New automatic. The publicity will not drum it in, but the new Studebaker transmission is virtually identical with Ford's. It differs in two respects: The selector quadrant remains PNDLR (leaving Ford-built cars in lonely status with their PRNDL), and it *always* starts up in low, not just when you boot it through the detent. The latter trait gives the car uncommon liveliness in heavy traffic. Studebaker engineers emphasize that this does not cost extra gasoline. Their explanation: A converter-plus-low start involves lesser throttle openings and less heat rejection than a converter-plus-second start, which, to produce identical acceleration, needs both a wider throttle and more oil churning.



SLICKEST WAGON that Studebaker has ever built is this new Pinehurst. A six-passenger job, it gets the full treatment in fancy trim and fittings. Power plant is the 289-inch V-8, with any transmission. There are two less expensive wagons, with smaller engines and plainer trim.

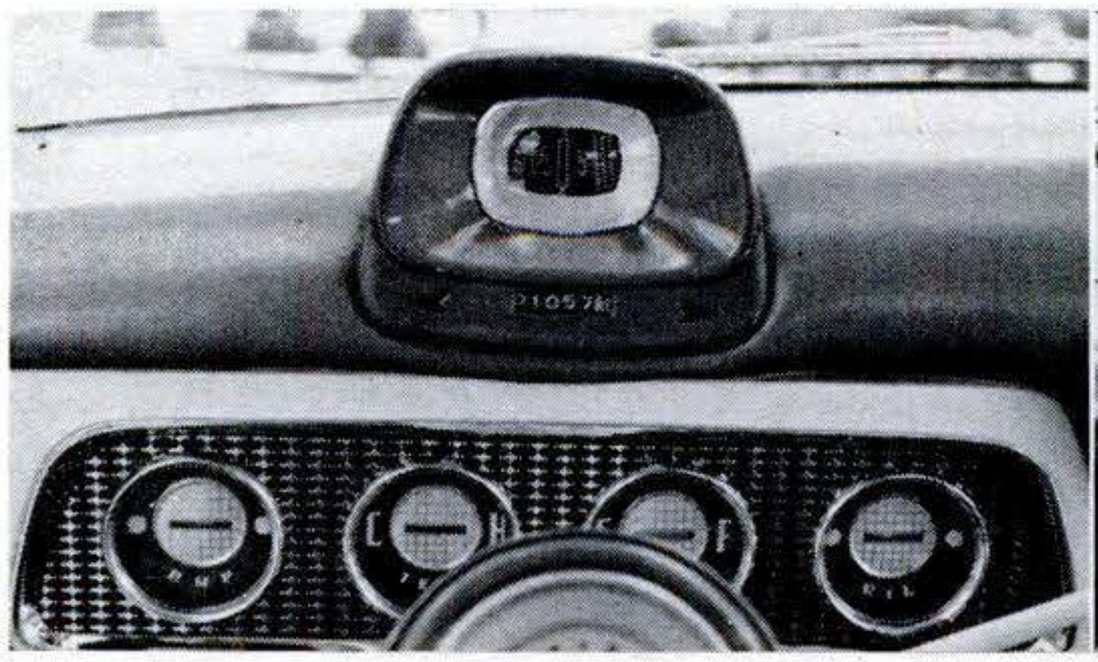
Copyrighted material

The sedans, squared up to suit the current taste, are handsome. There are many vivid color combos.

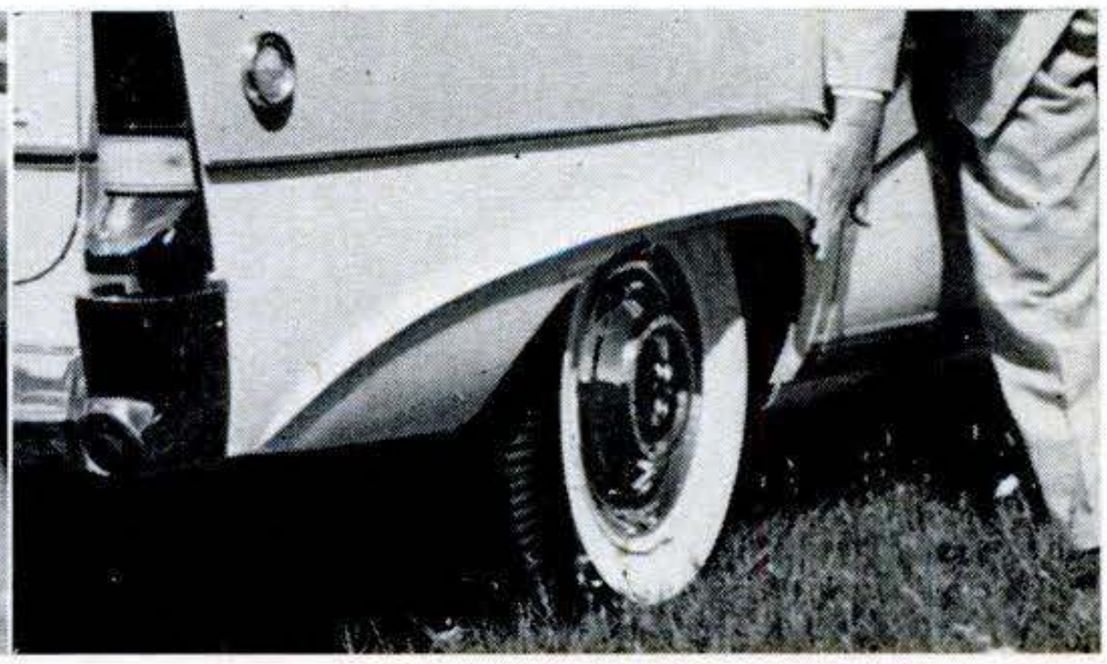
Champion six makes the gas go a long way.

Commander uses the smaller, 259-inch V-8.

The President Classic is the de-luxiest sedan.



THAT'S NO COMPASS, it's a speedometer. Figures are green to 35, yellow to 60, bright red thereafter. A vertical-drum speedometer somewhat like this wasn't unusual 25 years ago.



THOSE FLARING FENDER LINES may look as pretty as all-get-out when the car is brand-new. But if your lady is a garage-scraper, they're going to change from clean lines to frazzled ones.

With this new transmission Studebaker drops the direct-drive lock that it has had for years on its automatic. The reasoning here is simple: The lock-up has been a fine gadget in theory but modern converters have so little slip at highway speeds that the extra cost and complication aren't justified. Without it, moreover, there's a trifle more zip.

The V-8 is stroked. In the engine room you can now have a choice of three different mills, not counting the Packard:

1. A 185-cubic-inch L-head six, available in Champion sedans, Pelham wagons and Flight Hawk coupes. Rated at 101 hp., its performance will not terrify you, though it runs endlessly and cheaply.

2. A 259-inch OHV V-8, available in Commander sedans, Parkview wagons and Power Hawks. Changed only in minor carburetor details from last year's bigger engine, it is rated at 170 hp.

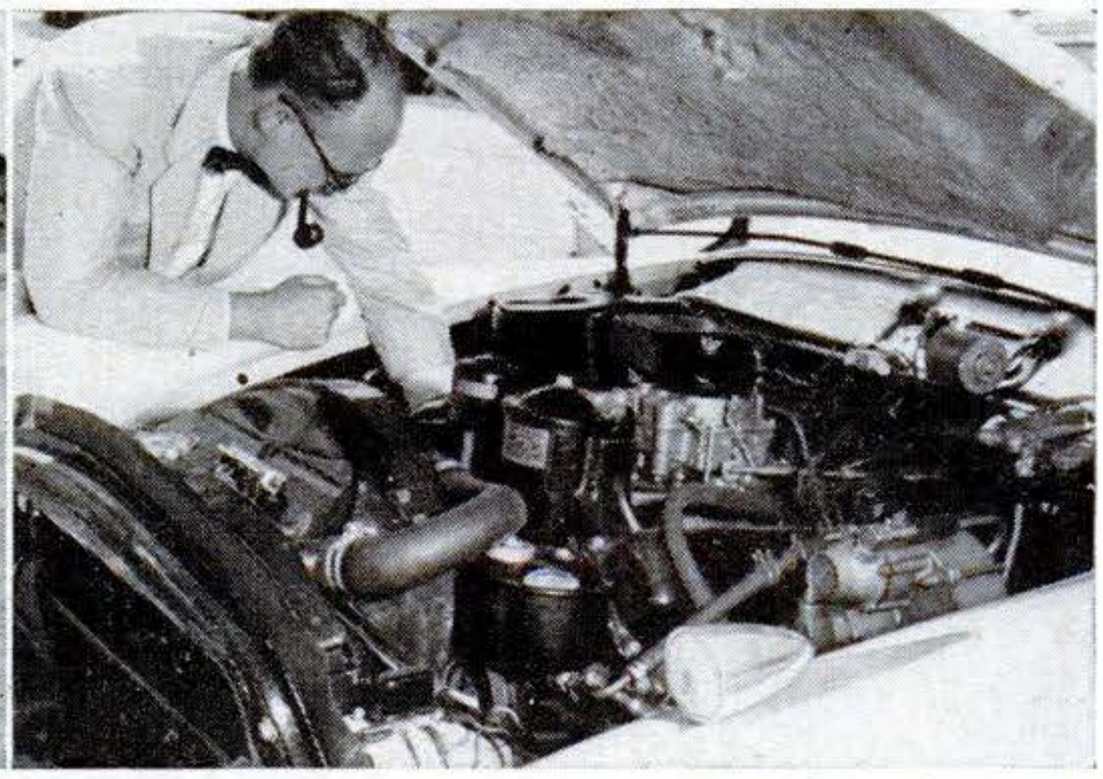
3. A 289-inch OHV V-8, for Presidents, Pinehursts and Sky Hawks. The bore is the same as on the smaller V-8 ($3\frac{9}{16}$ inches), but the stroke has been stretched from $3\frac{1}{4}$ to $3\frac{5}{8}$ inches. This engine has a new crank and pistons, of course, and slightly different main bearings. As on all Studebaker engines, the buyer can choose between compressions of 7.5 or 8 (it amounts to about the difference between gas grades). Horsepower: 190.

Medium-grade zip. For those who must have extra git (210 hp.), Studey provides a four-barrel carb and a dual-ex-

Copyrighted material

Don't drag-race with this Hawk

HANDWRITING ON THE REAR identifies the hot one. In side view (top) look for the chrome stone shield under the door. A drive-for-kicks car, it seats five and carries their luggage.



BIG MOUND OF MACHINERY results when the huge Packard-built 352-incher is crammed under the hood. Car shown above has power brakes and steering; others aren't quite so crowded.

haust system as an extra-price option on either V-8. (On one fancypants President, the Classic, the power package is standard.) It gives plenty of go; on a beat-up engineering car having the larger V-8, this writer clocked zero-to-true-60 accelerations of about 13.3 seconds with four men aboard. Although not the most theatrical getaway in the '56 field, this is still exhilarating.

All new sedans have twin pipes peeping out the back bumper, a fact that may baffle alert tailpipe observers, especially when they notice that no smoke ever emerges from the left one on any Champion or many Commanders. But you will not get the Studebaker engineers to blush over providing this dummy pipe. They simply smile blandly and point out that it is a lot more sensible to provide one dual-accepting rear bumper throughout the sedan line and then fit a stub dummy pipe on single-exhaust jobs.

On Hawks, that hood bump that seems to provide carburetor air is also a dummy. All V-8s breathe via a big, tubular cleaner that slants over the right cylinder bank. Studebaker engineers, harassed by a low hood, keep a fretful eye on the breathing problem. They claim that on the 352-inch prestige job the cleaner eats only three horsepower at top output.

Finding space in the engine compartment remains a critical problem; they even had to shift the hood insulation blanket to one side to clear the top of the 12-volt battery. Any mechanic who

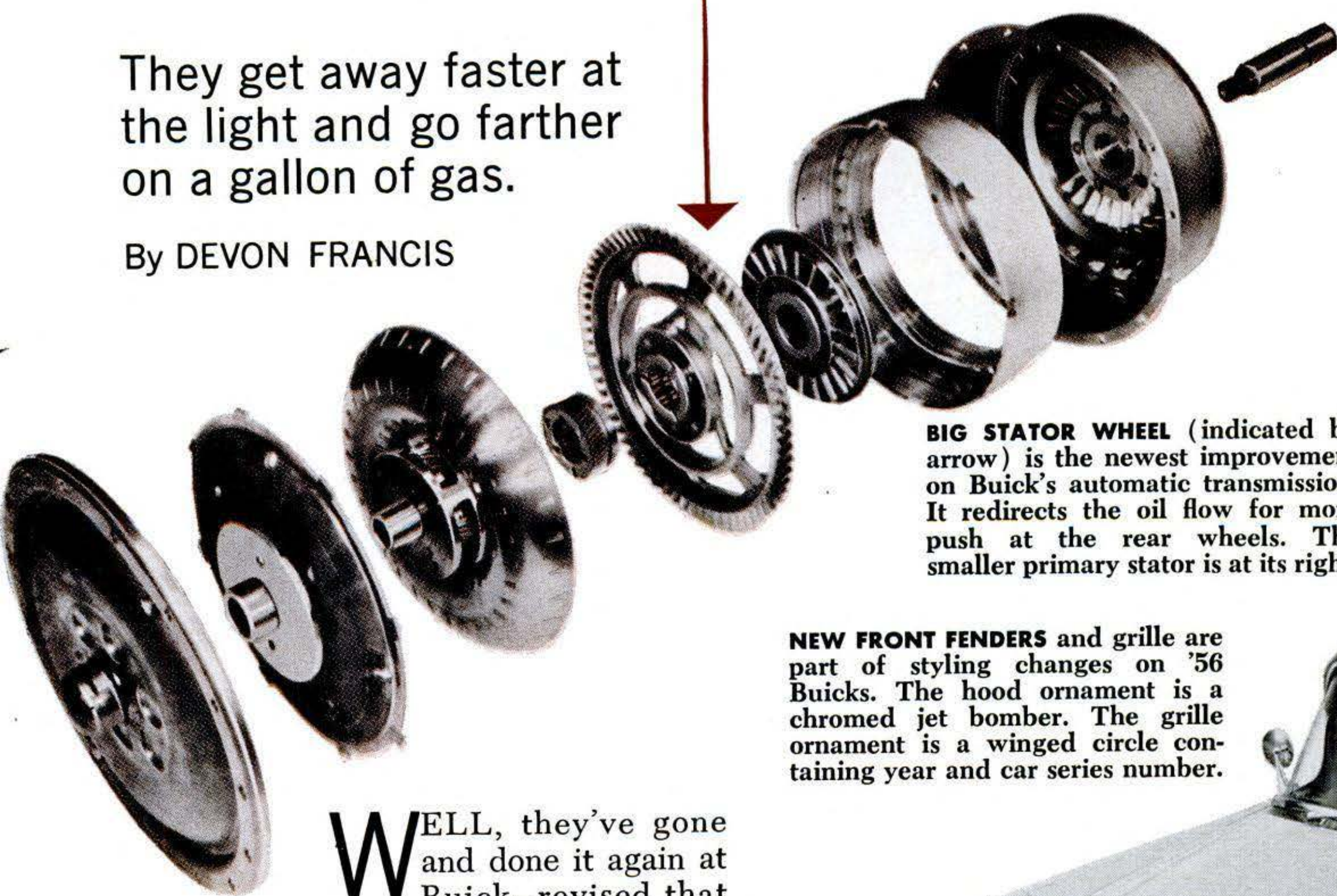
[Continued on page 246]

Copyrighted material

Dynaflow's New Trick Peps Up 1956 Buicks

They get away faster at the light and go farther on a gallon of gas.

By DEVON FRANCIS



BIG STATOR WHEEL (indicated by arrow) is the newest improvement on Buick's automatic transmission. It redirects the oil flow for more push at the rear wheels. The smaller primary stator is at its right.

NEW FRONT FENDERS and grille are part of styling changes on '56 Buicks. The hood ornament is a chromed jet bomber. The grille ornament is a winged circle containing year and car series number.

WELL, they've gone and done it again at Buick—revised that automatic transmission, that is.

For 1953 they put gears inside their Dynaflow drive to step up acceleration.

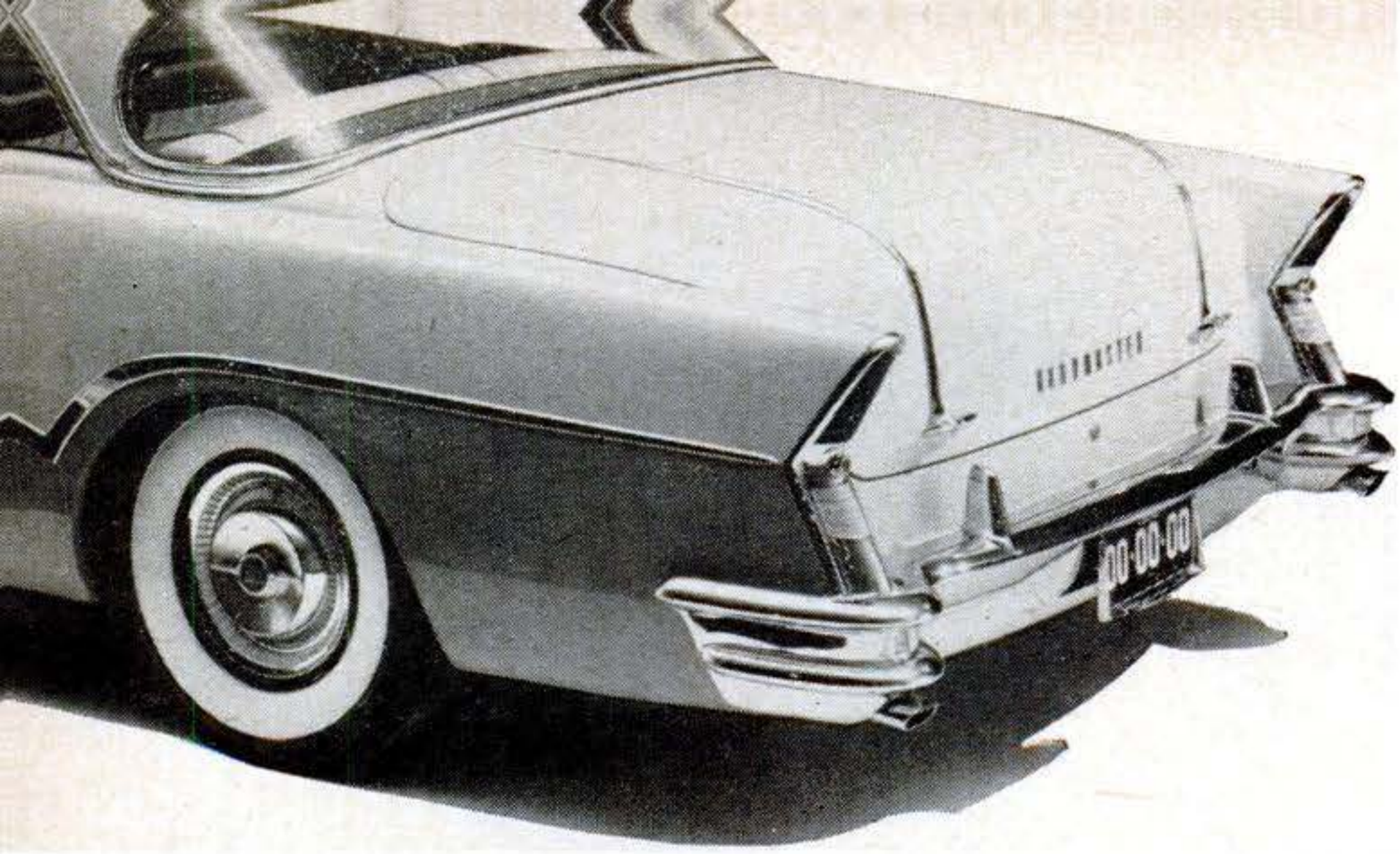
For 1955 they put a variable-pitch thing in it to step it up some more.

For 1956—the new cars were announced last month—they have put a fixed-pitch thing in with the variable-pitch thing to step it up *still* more.

It pays off. The 1955 Buick Super took 11 seconds to go from 10 to 60 miles an hour. The 1956 Super does it in 10.1 seconds. The new Special does it in 12, the Roadmaster in 10.7 and the jackrabbit Century in 9.8.

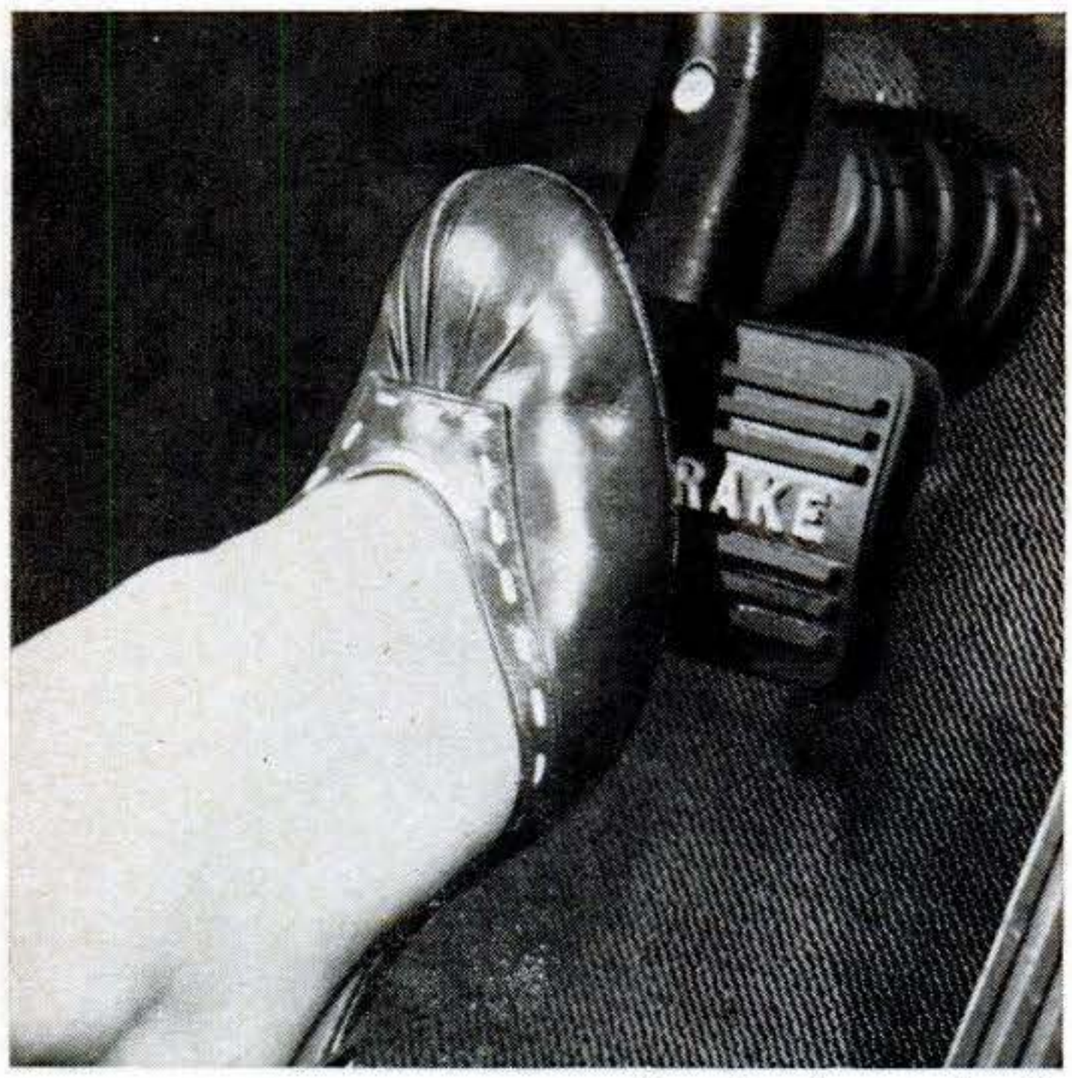
Power and torque help, of course, but anybody who discounts the push of that

Copyrighted material



A rear-view impression: full-wheel fender cutouts framed in chrome strips

FULLY EXPOSED WHEEL is outlined at top by a flat strip of sweeping spear molding carried through to the tail lights. Series designation has been removed from rear fenders. Chromed housing for lamps is heftier. Reflector is at center of "V," and backup light positioned below it.



SUSPENDED BRAKE PEDAL makes for better body seals, fewer drafts. It also improves pedal action and gives linkage better protection from weather. Rear brakes are a half-inch wider.

JACKING POINTS—at long last!—are now on frame side rails. Jack can be foot-operated. Photo shows rear wheel being raised. For front wheel, jack fits under rail inside bumper guard.

refurbished transmission has got a head that's out-of-round.

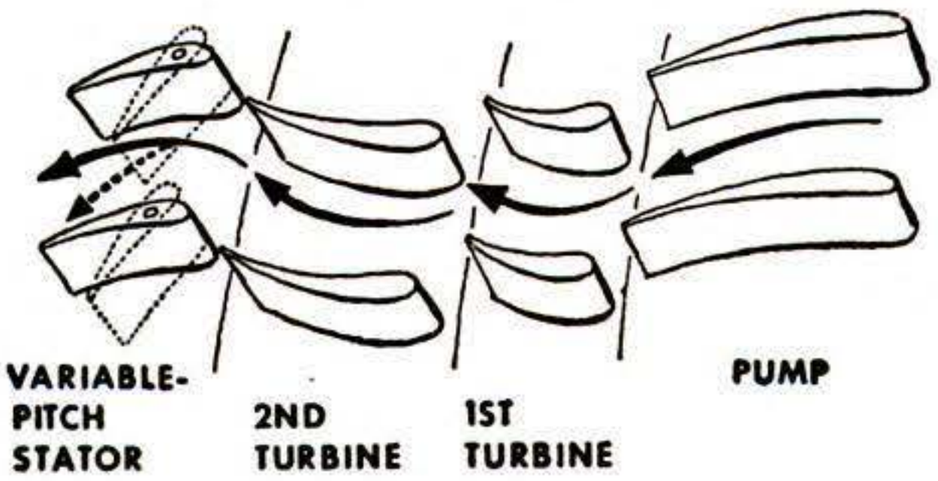
The transmission saves gas, too. The company is now so proud of its gas mileage that it's publishing the figures.

At a steady 20 m.p.h., the Super for '56 gets 19.5 miles to the gallon as against 19.3 in '55—with the same rear-axle ratio. At 30 it gets 19.9 and at 40 it gets 19.3, both better than last year. Beyond those speeds, there's no change.

The other cars in the line also show improved fuel economy in the same speed ranges, although only the axle ratio of the Special has been changed (favorably) over '55.

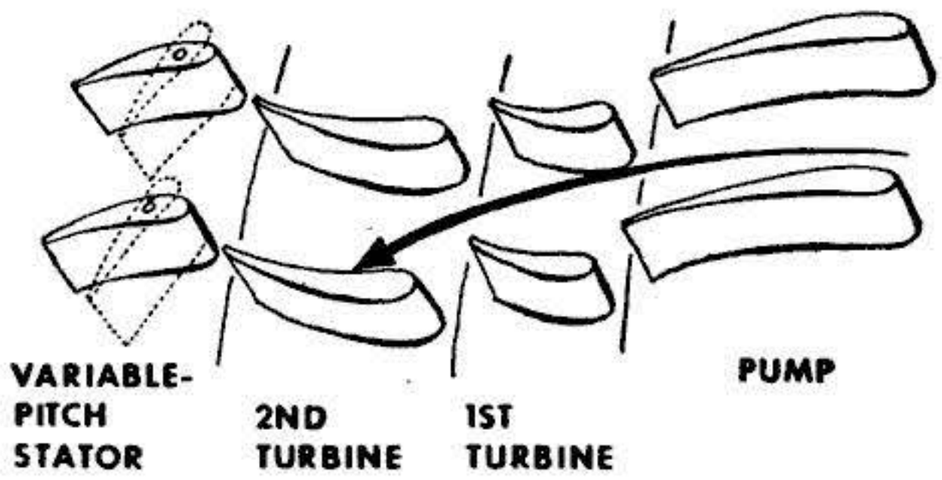
What Buick has done to its transmission is to add a fixed-pitch stator. Stators are those pieces of hardware in a torque converter that redirect the flow of oil so that it will multiply the torque effort of the engine. Conventional transmissions multiply torque with gears. Torque converters do it with pumps, turbines, stators *and* gears.

Heretofore, using only the variable-pitch stator, a first turbine in the Dynaflow transmission was pooped out by the time a second turbine began operating. This was the way the oil flowed in the '55 transmission when the first turbine was manufacturing torque:

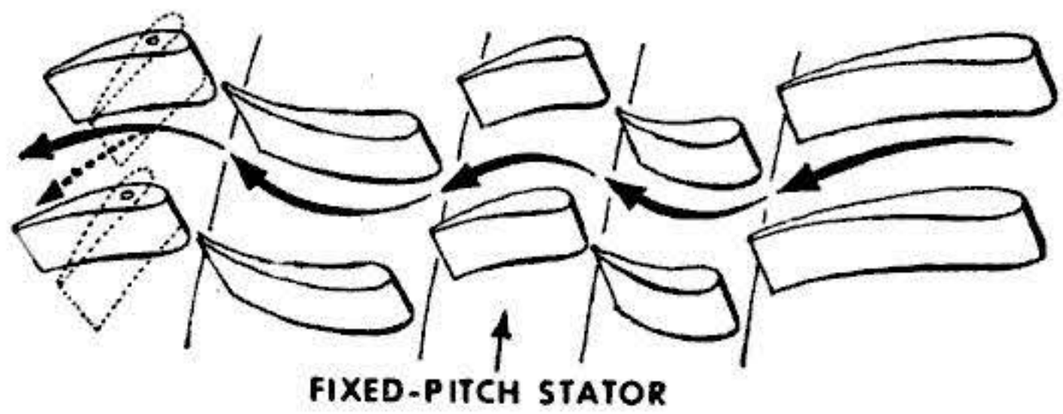


Copyrighted material

And when the first turbine began rotating at the same speed as the pump, this was the oil-flow pattern to the second turbine:



Here is the oil flow for '56, with the added stator permitting the two turbines to work together:

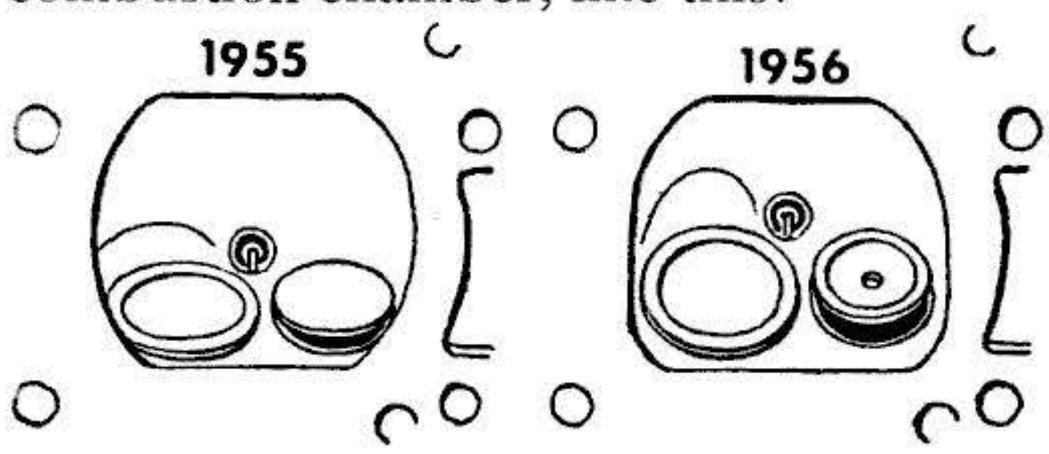


They did one other thing to the Dynaflow. Through 1955, you could get extra push at the rear wheels with that variable-pitch stator only in Drive range. In the 1956 cars, you can get extra push in Low range, too.

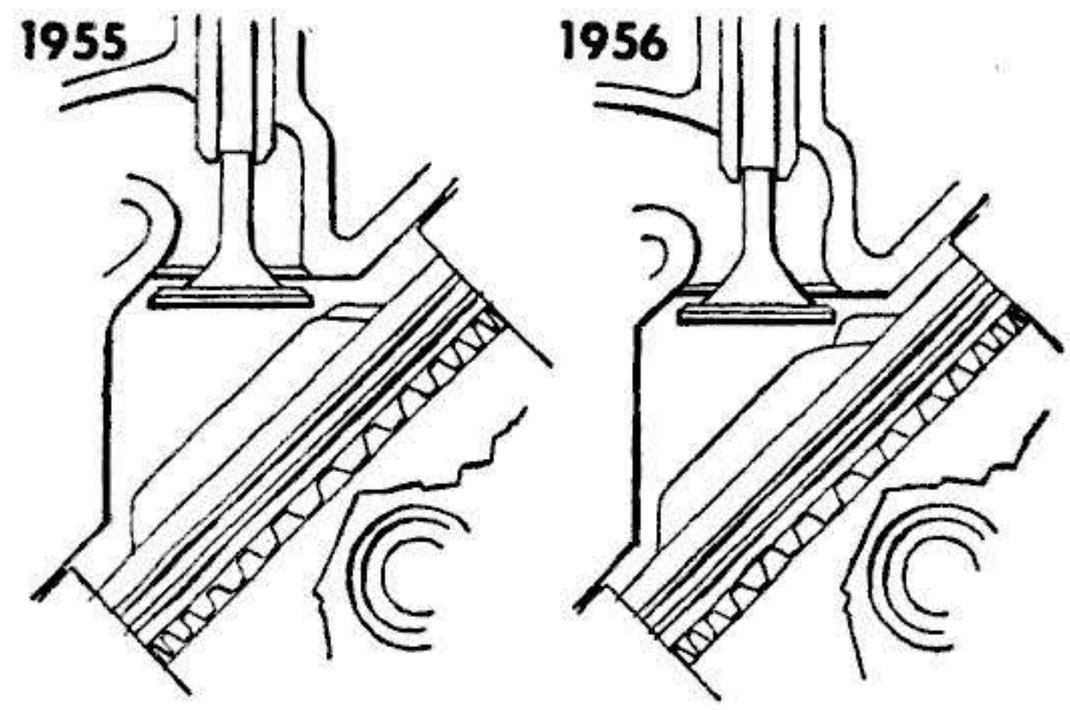
A lot of other changes, none of red-alert importance, but adding up to better performance, comfort and appearance, also have been made in the new Buicks. Direct-acting shock absorbers cushion the ride better. A dual-exhaust system, optional in some instances, increases torque for passing. The Special's rear brakes are bigger.

Horsepower? You should ask! It's up, of course. The Special is at a measly 220 horsepower, up 32, and the Super, Century and Roadmaster are at 255, up 19.

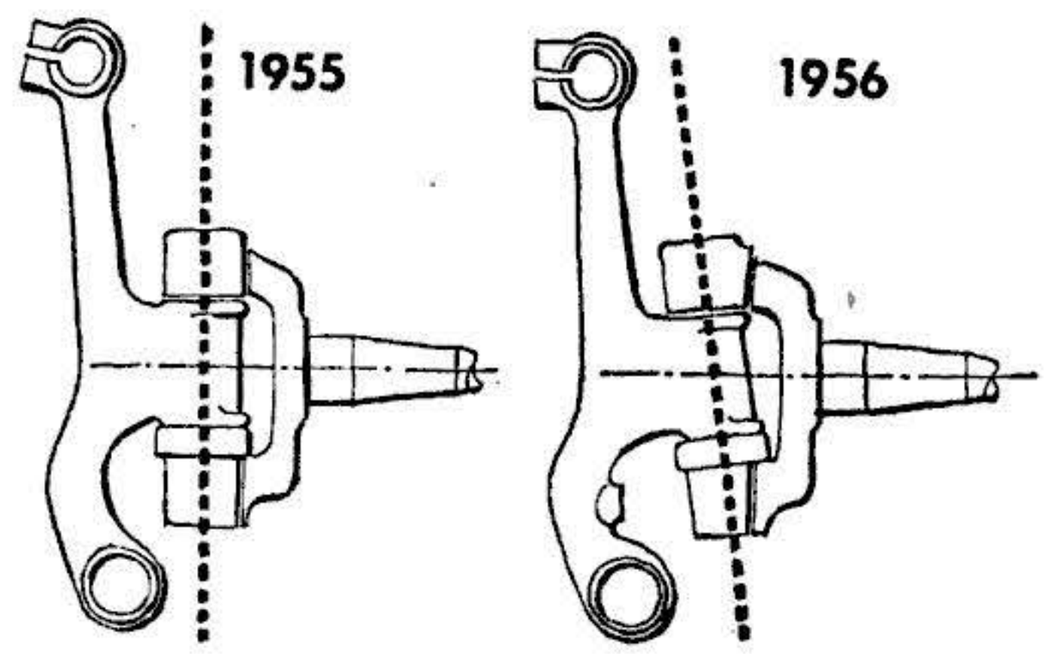
One of the ways they got the additional power was to change the shape of the combustion chamber, like this:



They upped the compression ratios, changed the cams and fixed the exhaust manifolding so that it's easier for the burned gases to get out of the cylinders. There's better valve clearance at the cylinder heads. Here's how:



Then there's the front suspension and steering. The new cars take a little more muscle to force into a turn. They "understeer," as the engineers say. The steering arms are the same as those in 1955, but the ends have been raised a quarter of an inch. Directional stability has been improved by changing the inclination of the kingpins, like this:



The power steering is improved. With an over-all ratio of 17.5-to-1, the gear gets more boost from the power unit. The hydraulic oil is used as a lubricant, eliminating the need for greasing. A six-way power seat is offered as an option, and notwithstanding the fact that GM is soft-pedaling safety, you can get seat belts if you want them.

The air-conditioning unit—also optional, of course—is now all snugged into the engine compartment instead of being divided between there and the trunk.

All the new Buicks have wheel cutouts on the rear fenders for that sporty look; and in case you wondered, Buick's trademark fender holes are retained. For '56, they're oval. END

Copyrighted material

New Hudson, New Nash Veer Apart

These brother autos now offer more individuality in styling, new luxury, higher horsepower.

A LITTLE more of everything, from torque to tones, is the word from American Motors on its big cars for 1956. The planned dissociation of Hudson and Nash in appearance, despite the use of many of the same body parts, is perhaps the biggest change this year. Hudson's front and Nash's rear have been heavily modified, and this, combined with divergent detail and trim, successfully hides the structural kinship.

Hudson engines. At the top of the heap is a big V-8. Built by Packard for American Motors, it is a 352-inch engine rated at 220 horsepower and 320 pound-feet of torque. (Last year's figures were 208 hp. and 300 pound-feet.) With a compression ratio of 9.55:1, it wants premium gas. It shaves a solid second off last year's zero-to-60 time, bringing it down to 12.5 seconds true. The engine comes only with Packard's automatic transmission.

For calmer buyers there's the big L-head six, rated at 165 and 175 horsepower, depending on carburetor option. It likes regular gas, has a respectable 278 pound-feet of torque and can be had with a synchromesh box, overdrive or Hydra-Matic. Principal changes: new camshaft, hydraulic lifters, a 12-volt system. Hudson also offers a smaller L-head six, rated at 120 and 130 hp. It has the same transmission options.

Nash engines. At the top is the same

Major face-lift up front changes the looks

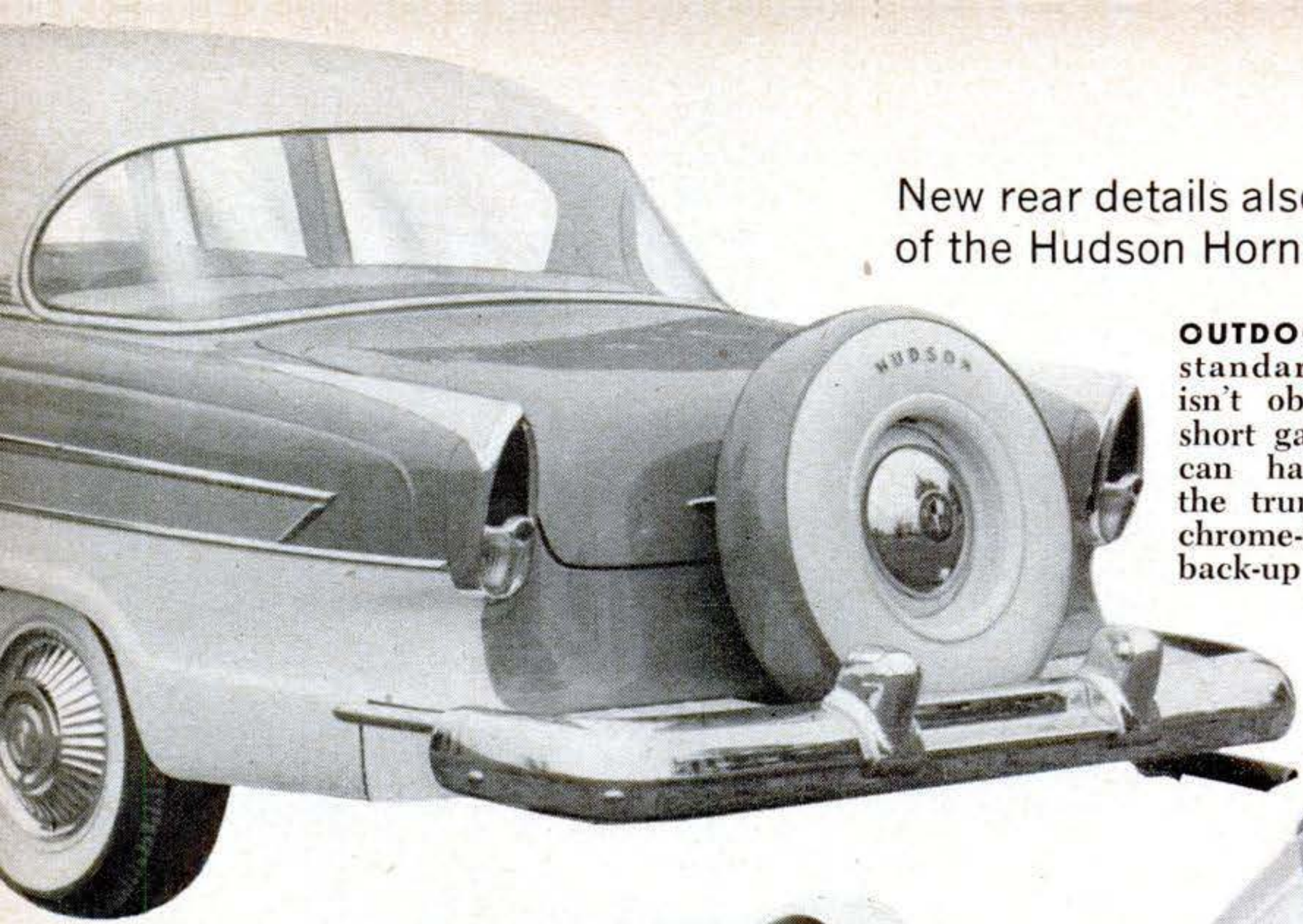
New Nash, also urged by a 220-hp. mill,

Copyrighted material

of the new Hudson, which can be had in three-tone paint combos. A 220-hp. V-8 engine runs it.

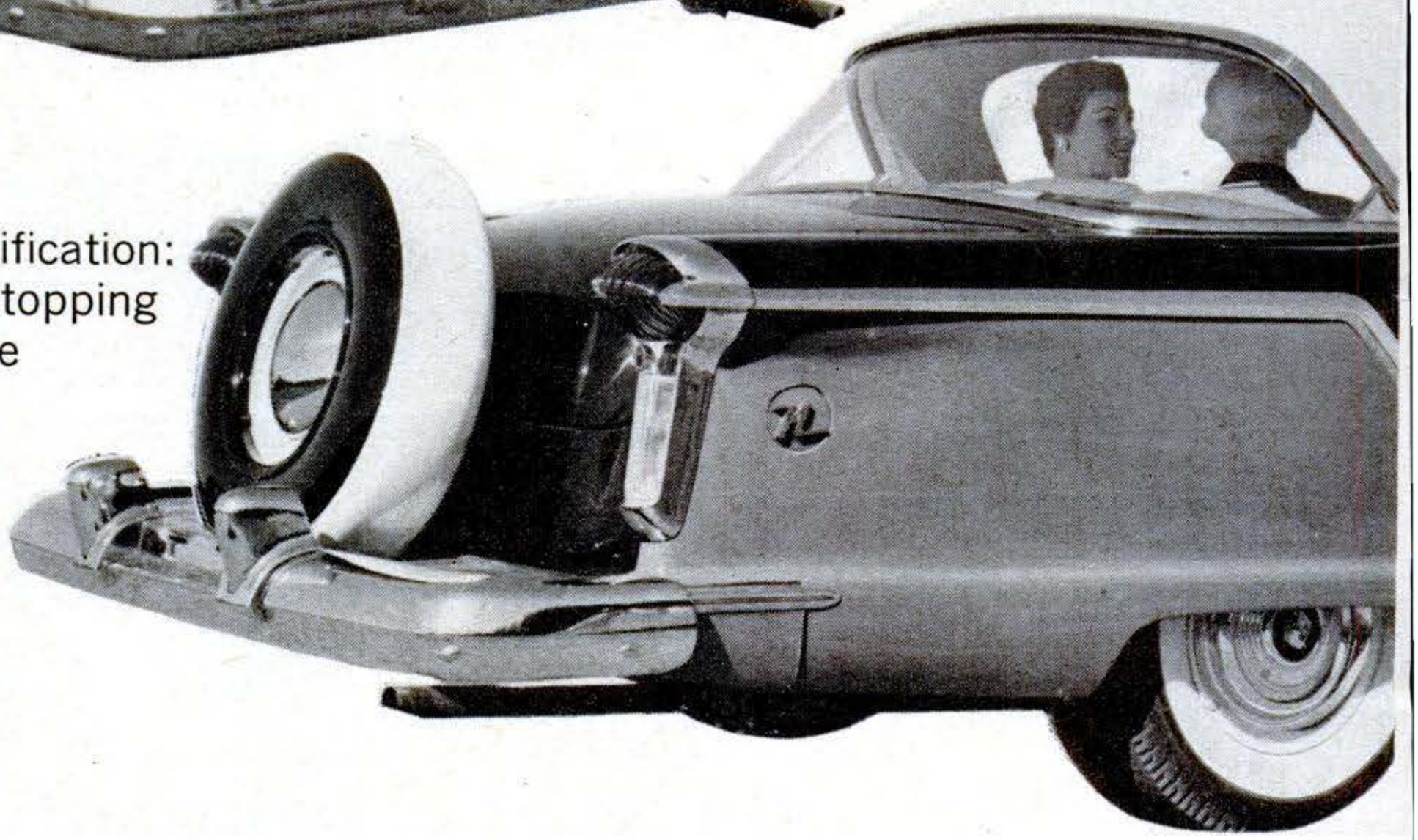
shows less change in styling of front. Inboard headlights remain an easy identification feature.

Copyrighted material



New rear details also change the look of the Hudson Hornet going away

OUTDOOR SPARE, though standard on fancy models, isn't obligatory; buyers with short garages or chaste tastes can have it tucked inside the trunk compartment. The chrome-finned tail lights and back-up lights are redesigned.



For '56 Nash identification: monster tail lights topping a higher fender line

IT ADDS 10 INCHES to the 209¼-inch over-all length of the Ambassador to let that spare hang out in the cold. (It also adds two cubic feet of luggage space.) Seat width is ample: 65 inches in front, 64½ inches in the rear.

BYE-BABY FRONT SEATS, which loll back in easy stages and drop flat for full-bore snoring, remain a prized feature for Nash and Hudson. Car shown had doorpost removed for picture.

Packard-built 220-hp. job. Next comes Nash's OHV 6, with a displacement of 252.6 cubic inches. If laden with one carb and the title "Super Jetfire 6," it puts out 135 hp.; if given two pots and the name "LeMans Dual Jetfire 6," it is provoked into delivering 145 hp.

For its less expensive models, Nash uncovers a brand-new engine, a tiny but high-output OHV six. With a displacement of 195.6 cubic inches, it socks out a respectable 130 hp. at 4,500 r.p.m. This gives the car substantially more sass than last year, when it came with L-heads of 100 or 110 hp. The new job has a bore of 3⅛ inches, a stroke of 4¼, compression of 7.44:1, and a sparing appetite for regular gas. It should come as no surprise to see this engine, with different carburetion, in the 1956 Rambler. END

Copyrighted material

MG Gets Curves, Power, Performance

SEARCH as you may, it's hard to find a straight line on the new MG, latest model in a series of hitherto uncompromisingly angular little roller skates. The MG Model A, as extensively rounded as a pin-up girl, now looks like many another imported sports car. It will be readily confused by the inexpert, or the indifferent, with the Austin Healey 100.

Beneath the skin there are changes, too. The permissible revs have been pushed up to 5,500, and the car will now willingly top 90 m.p.h. All ratios within the four-speed gearbox have been modified, and the little two-seater now runs with a 4.3 rear axle in place of the previous 4.875.

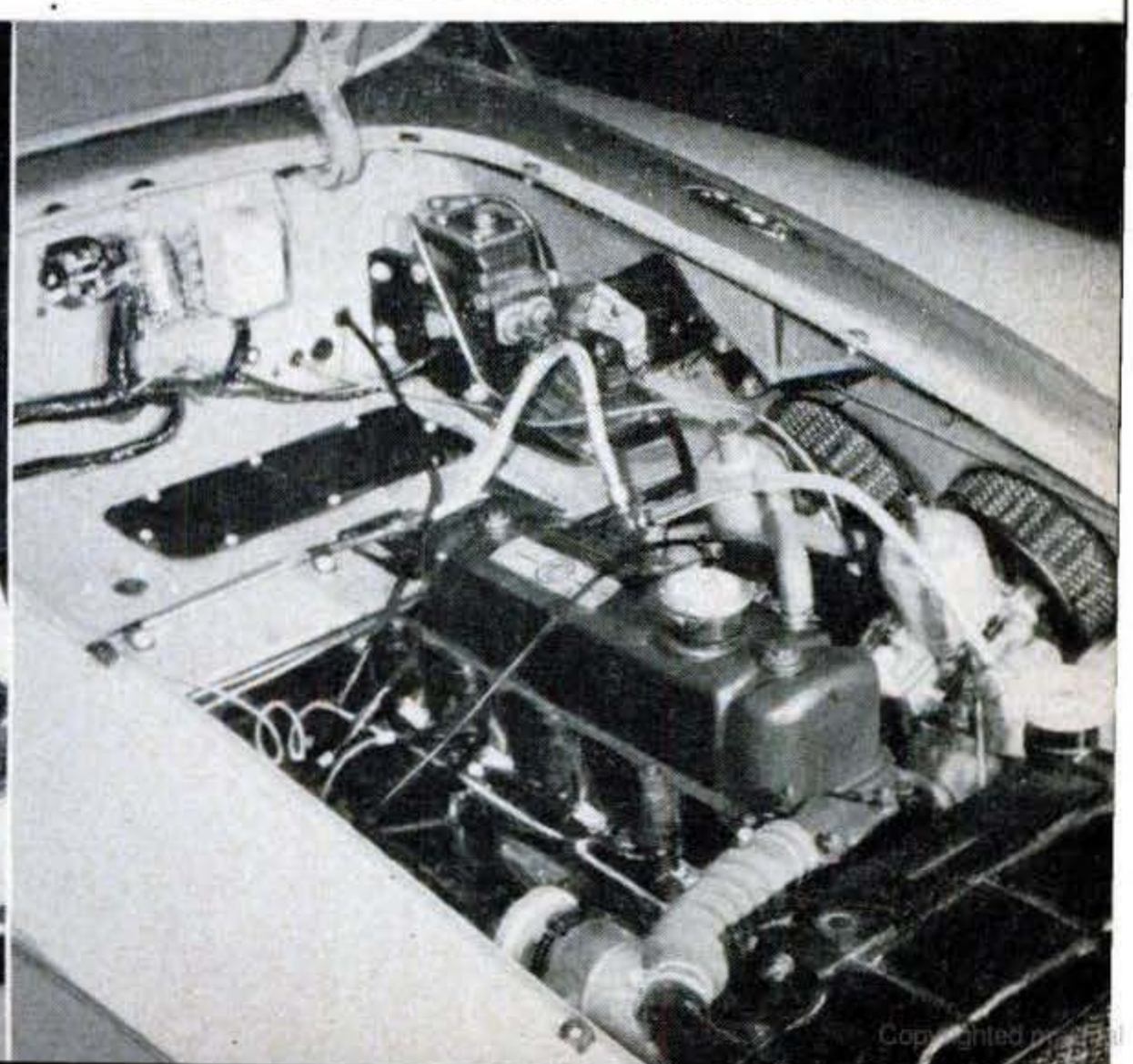
The engine is subtly modified from its TF 1500 predecessor, which was almost a fifth bigger than *its* predecessor:

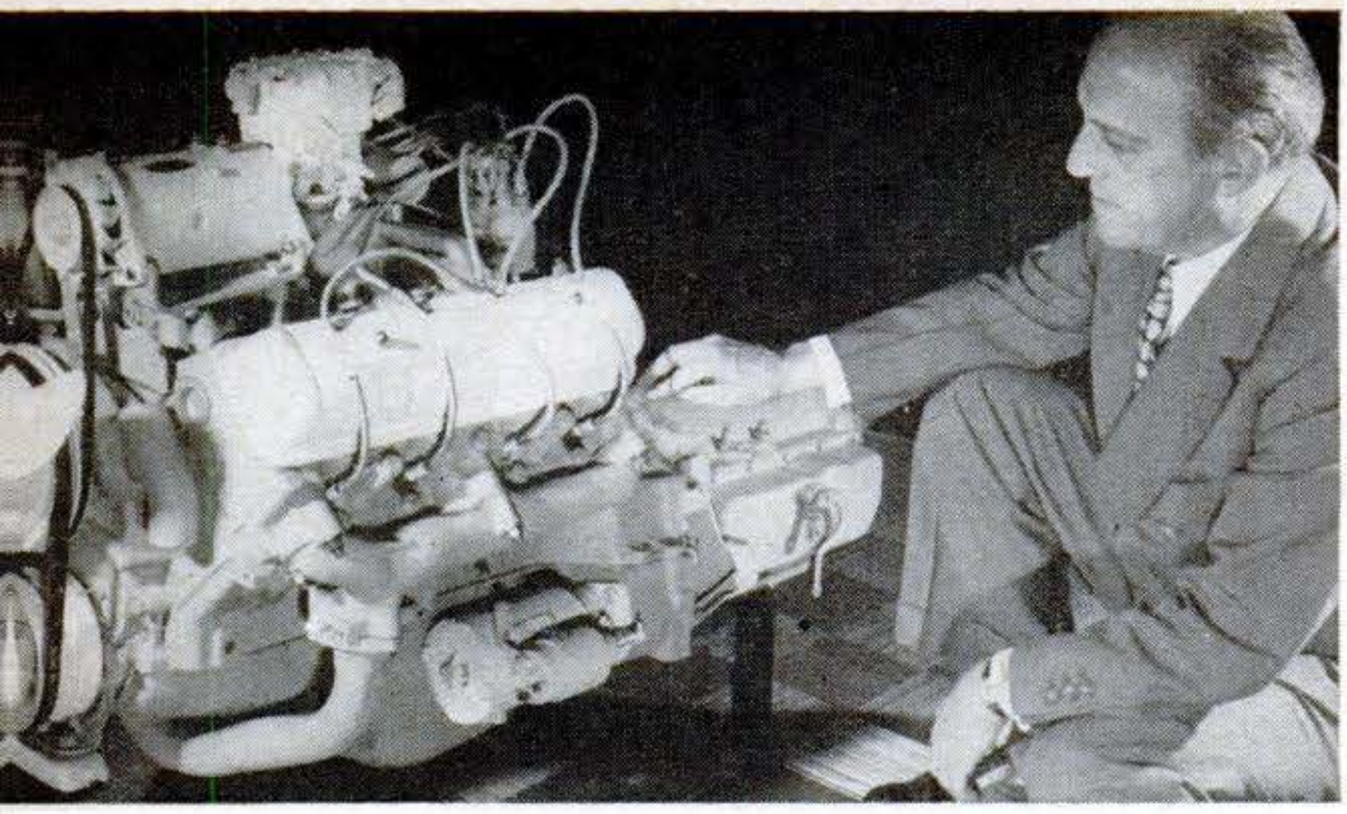
	Model A	TF 1500	Change
Bore	2.875″	2.834″	+ .041″
Stroke	3.5″	3.54″	− .040″
Disp. (cu. in.)	90.88	89.45	+1.43
Hp.	68	63	+5

While steering and suspension remain nervously alert in the best MG tradition, comfort is now catered to: more leg room, larger luggage space and, for the first time, a real gasoline gauge.

THIS IS AN MG? Hardened owners of TC models will frown at such departure from austerity as the metalized fabric cover on the inside spare. Deck lid has a remote-controlled latch.

BUSY LITTLE BEE still buzzes under the bonnet. One unit of dual master cylinder in background operates clutch. The batteries (there are two) are located behind seat for better balance.





1949

HIGH COMPRESSION V-8 was new idea when Jack Wolfram, then chief engineer, introduced engine.

1956

BASIC ENGINE, unchanged, has same block, rods, bearings, crankshaft. Wolfram now heads Oldsmobile.

Oldsmobile Hops Up That Engine—Again

Subtle changes from year to year since 1949 have boosted its horsepower by a whopping 105.

ONCE each year, when summer's dog days descend upon the land, a couple of fellows who act like tourists climb into an automobile at Lansing, Mich., and set off on a long safari.

If they have any fun, it's only incidental. They have a mission. They are field-testing gasolines all over the U.S. with an Oldsmobile engine that has a compression ratio intended for introduction 18 months later.

The information is important. On the antiknock quality of the gasolines available depends how high automobile-engine compression ratios can go more than a year hence. In turn, on *that* depends, largely, what power can be built into engines.

The year-to-year findings of the traveling men from Lansing are of more than passing interest to Olds: It was the company that in 1949 sparked the industry in building the postwar hothead V-8s. Olds marked out the starting line for Detroit's all-out "horsepower race."

The results of the 1954 trip by the tourists from Lansing showed up last month when the company introduced its 1956 cars. Its top engine bulged at 240 horses. That was 105 horses more than Olds had boasted seven years before from what looked, outwardly, like the selfsame engine.

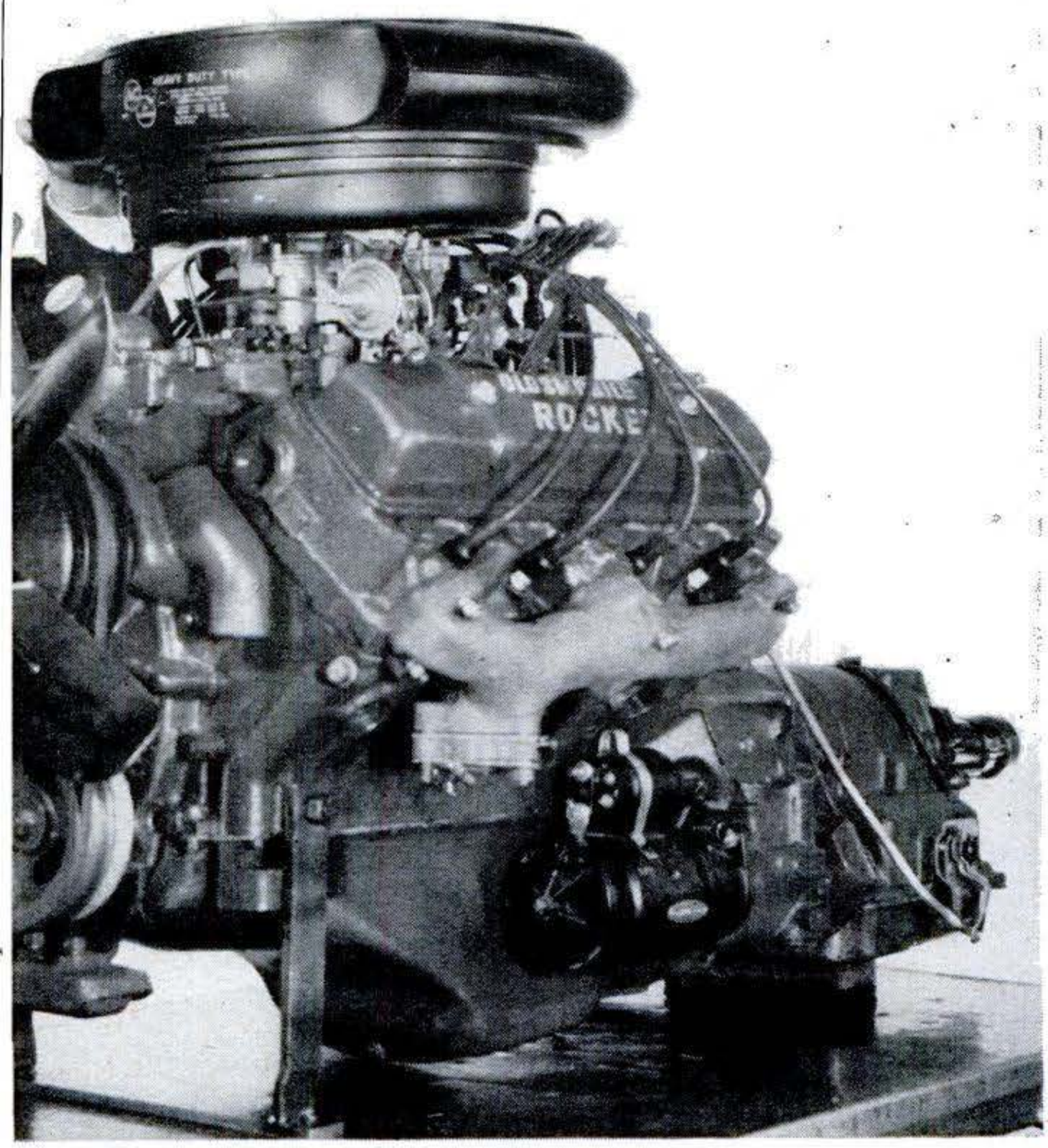
Other gains between 1949 and 1956 are impressive. Along with horsepower, the torque—which determines the push at the rear wheels on take-off—has skyrocketed. In 1949 it was at 263 foot-pounds. In 1956 it's at 350 foot-pounds.

The car has knifed 3.2 seconds off its acceleration time from a standing start to 60 miles an hour, despite the fact that it weighs several hundred pounds more.

And even with that added weight, it gets more miles to the gallon of gas than it got in 1949.

Something has happened in those seven years. What is the source of so much more power on less gas? Just as

Copyrighted material



THIS IS THE WAY THE HORSEPOWER GREW:

1956 Ratio put at 9.25:1, carburetor enlarged, intake manifold modified, piston weight increased, rings improved, cam and distributor redesigned, exhaust ports widened. — 240 HP.

1955 Ratio upped to 8.5:1, combustion chamber redrawn around exhaust valves for better breathing, valve lift boosted with modified cam. — 205 HP.

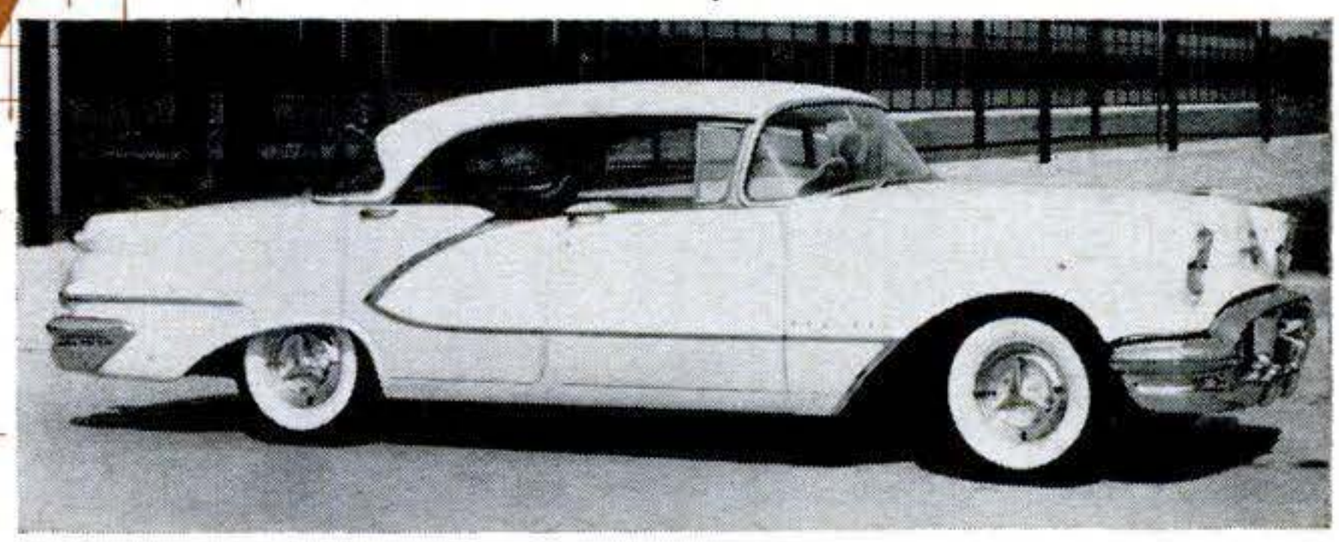
1954 Ratio increased to 8.25:1, displacement from 303 to 324 cubic inches, manifolding and valve ports enlarged, valve lift boosted, rings chrome-flashed. — 185 HP.

1953 Compression ratio upped to 8:1, 12-volt electrical system installed. — 165 HP.

1952 Valve lift increased, camshaft modified, piston weight boosted, four-barrel carburetor added. — 160 HP.

1949, 1950, 1951 Horsepower was static: Olds had no competition. Boost in compression ratio in 1951 to 7.5:1 raised power but Olds did not advertise it. — 135 HP. 135 HP. 135+ HP.

THE 1956 LOOK: This four-door hardtop in de luxe "98" Holiday version is the fanciest of Olds' models, announced last month.



important, how much additional power can this engine yield in the future?

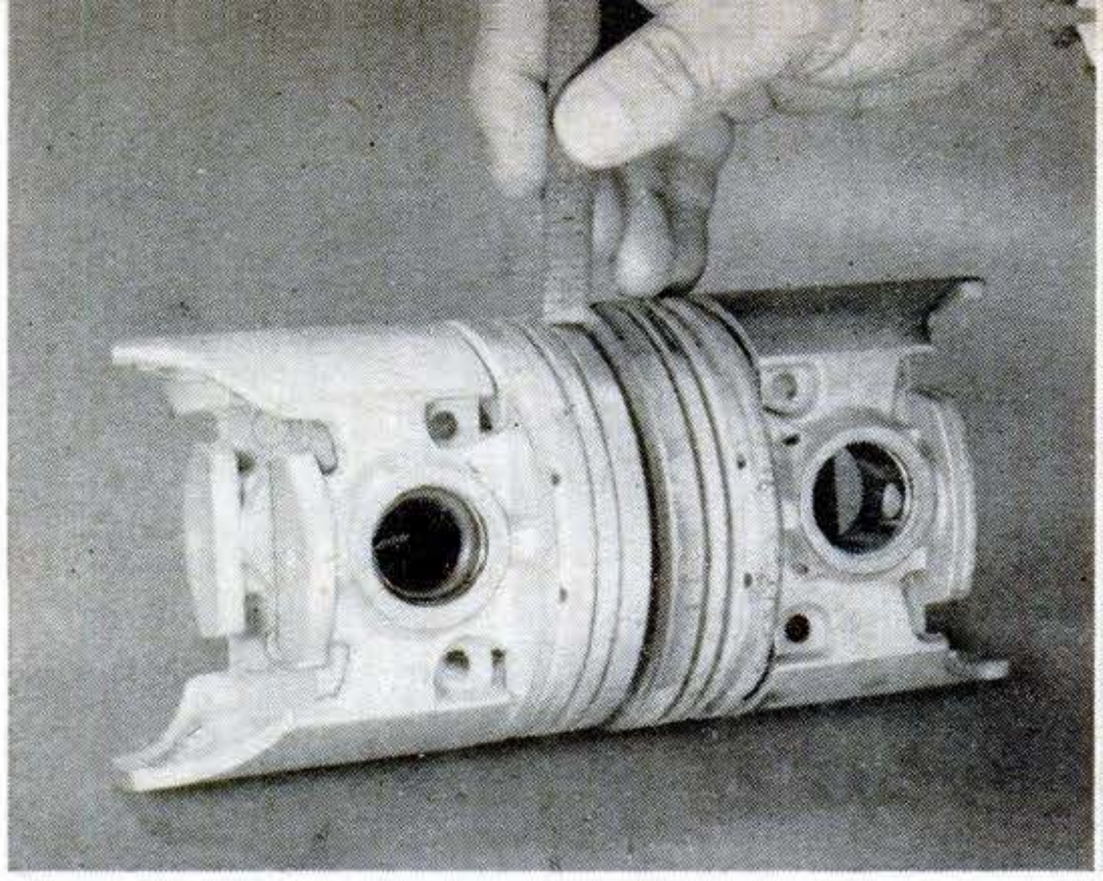
The first question was answered in advance on August 18, 1948, when technicians from the General Motors research labs told a Society of Automotive Engineers meeting in San Francisco that high-compression engines promised "large gains in fuel economy" if better gas became available at a reasonable price.

Experiments by Charles F. ("Boss") Kettering, GM's aging but still sassy consultant, were what they were talking about. Ket had boosted miles-per-gallon by a third with an engine that he had pushed up to a 12.5:1 compression ratio.

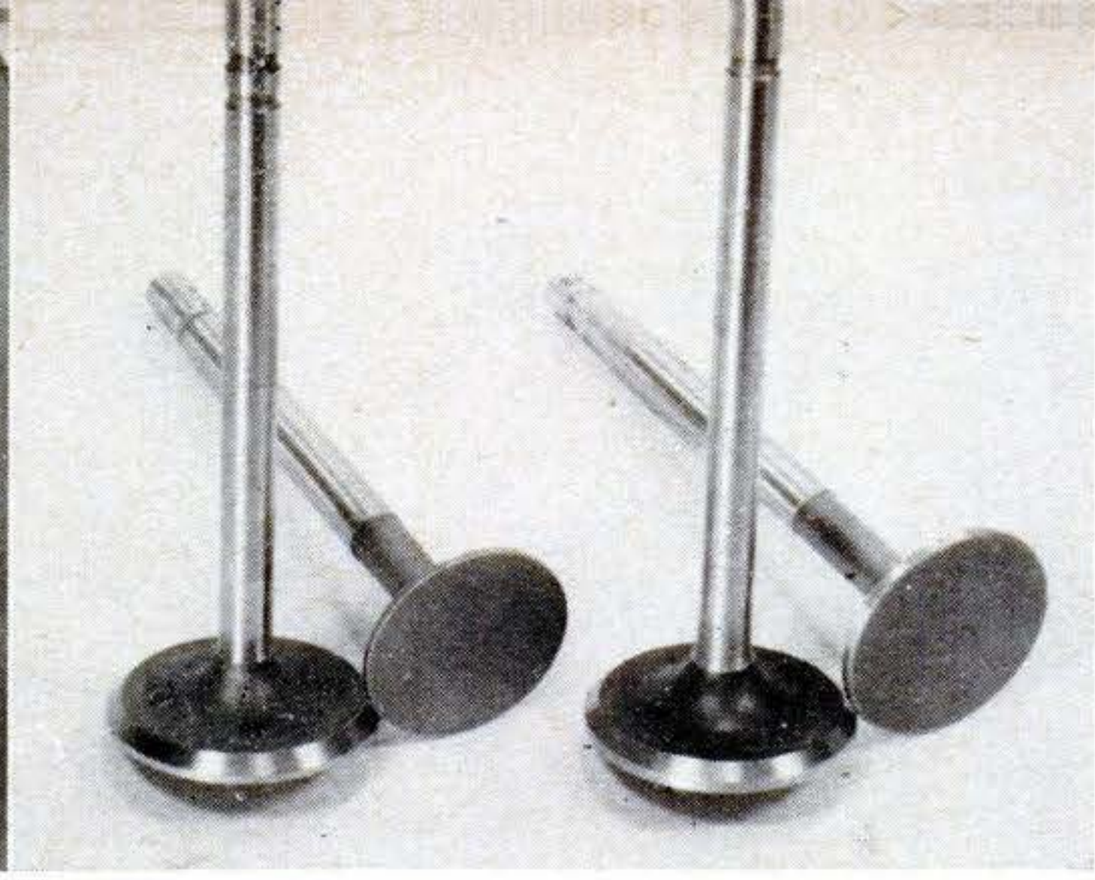
The oil companies read the San Francisco statement with a bilious eye.

"When we talked about 95-octane fuels," an Olds engineer recalled the

Copyrighted material



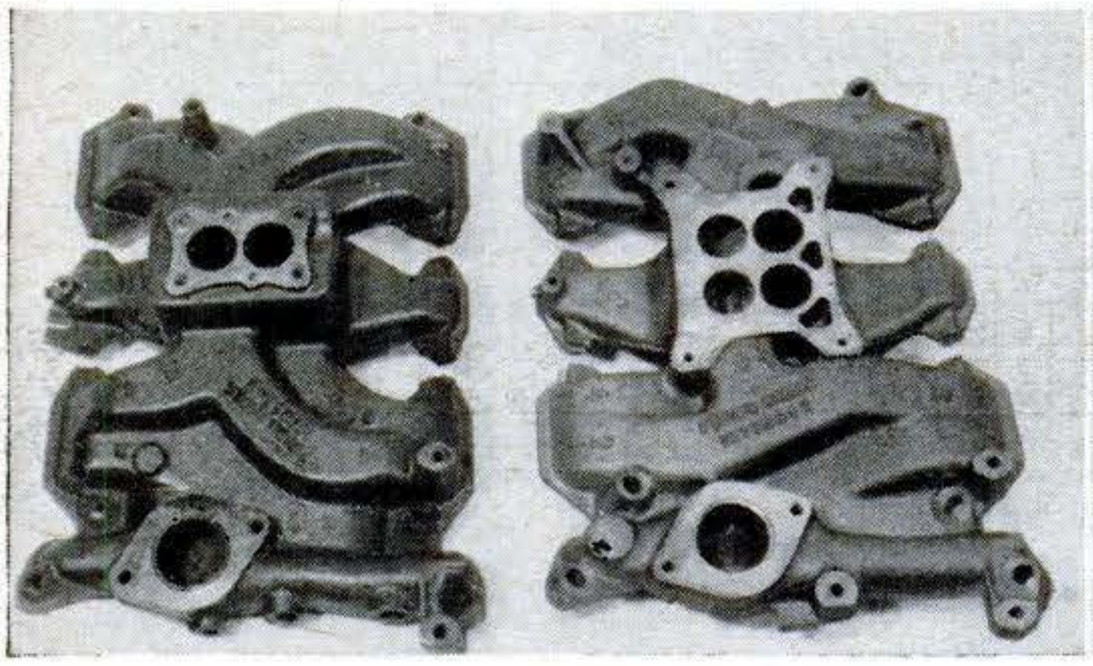
PISTON HAS GROWN ⅛ inch in diameter and increased 52 grams in weight in seven years. Original V-8 weighed 5.52 pounds per horsepower; newest version weighs only 3.2 pounds.



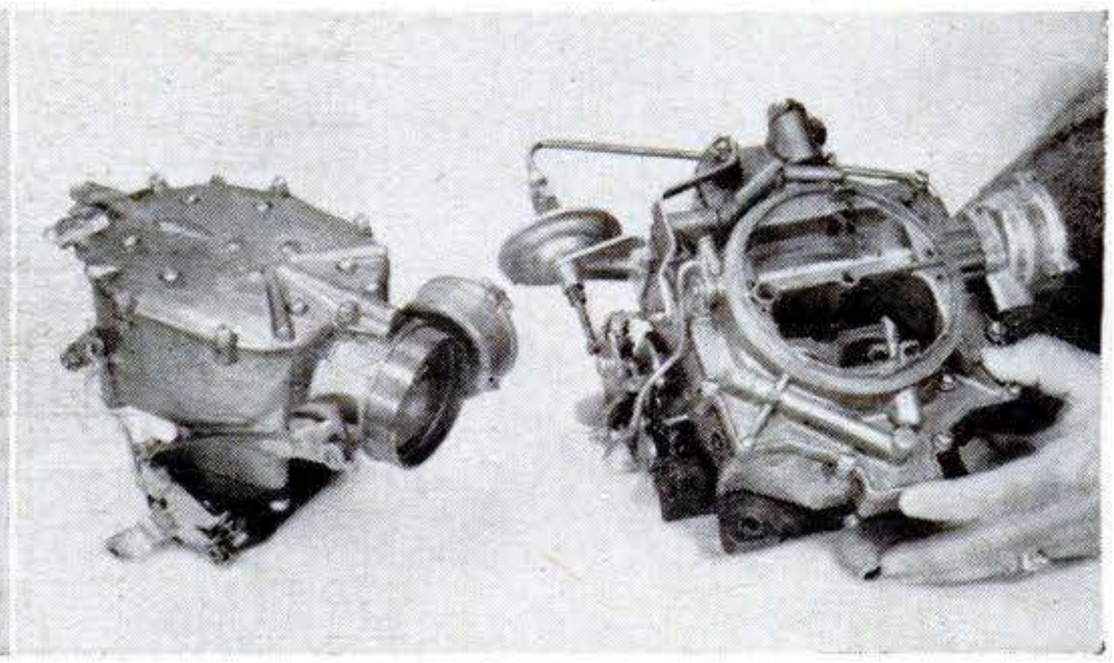
VALVE SIZES have changed little. Original intake and exhaust valves (left) measured 1¾ and 1 7/16 inches. Latest intake is the same, but exhaust valve has been increased ⅛ inch.

Four ways the Olds engine has changed in seven years

MANIFOLDING in 1949 (left) showed sharper turns than that in 1956 engine, reflecting effort to "open up" breathing. Dual exhaust systems are optional on all models for '56.



NEWEST FOUR-BARREL CARBURETOR (right) is big-throated compared with two-barrel original. Compression pressure has gone up for six years. In 1949 it was 200 pounds; now it's 258.



other day, "the refiners made mouths. They figured that they had done pretty well in producing 90 octane for cars. They said that it would take years and years to push it to 95."

But Olds already was plowing ahead with an overhead valve, high-compression V-8. Its old L-head straight eight was at the end of the road.

Prototype engines, sheathed in yesteryear's sheet metal and sent out on the road for tests, had to stop at airports for the high-test gas that their finicky appetites required.

The new engine was announced in December, 1948. It had a compression ratio of 7.25:1 as against the old engine's 6.7:1. Smaller, more compact, it weighed only 5.5 pounds for each horsepower produced, against 6.2 pounds in the straight eight. It produced 135 horsepower against 115.

And it got almost 19½ miles to the gallon of gasoline at a cruising speed of 50 miles an hour, contrasted to 17½ miles for the old engine.

"The engine," said POPULAR SCIENCE MONTHLY in its issue of January, 1949 (p. 167), "promises to pace a revolution in gasoline-fed automotive power plants."

It fulfilled that promise. As late as 1951, the average horsepower of U. S. automobiles was only 117. For 1956, it's more than 225.

How did Olds—and the rest of the industry—do it?

Better fuels, of course, keyed the advance. The refiners are years ahead of their own guesstimate. In 1948 the national average octane for "regular" gas was 70. That for premium was 90. This was suitable for engines within the 5-to-1 to 7-to-1 compression range.

[*Continued on page 260*]

Copyrighted material

New Tricks of the Trade in Cars Abroad

Stylist's Own. U. S. designer Raymond Loewy shows two-seater Jaguar that he styled for himself. It has a roof opening, all-around visibility, a jump seat, extra luggage space.

One-Piece Gate. A large rear window in this British Humber Hawk station wagon cranks into the tailgate from outside. Thus it can be partly opened for ventilation or, as here, be retracted out of sight. When the tailgate is opened, a spring-loaded floor panel slides over the hinges to make loading easy.

No Back-Seat Driving. Riders in the rear of this four-passenger German midget face backwards. Doors, front and back, flip up to ease crawling in and out. The Dornier Delta has a one-cylinder, 14-hp. engine under the floor in the middle. It can do about 50 m.p.h., costs around $700.

Copyrighted material

Gus Plays a Double

"Here, Santa," said one boy, offering his newly acquired present. "Use my tool kit."

Copyrighted material

The master mechanic works under wraps to rescue young faith in Christmas miracles.

By MARTIN BUNN

GUS WILSON, genial proprietor of the Model Garage, was having the time of his life. He was playing his usual role of Santa Claus for the Christmas festivities at the elementary school. Gus made an imposing figure as he moved among the happy, excited children, distributing gifts from the bulging pack on his back, red stocking cap worn at a jaunty angle, white beard flowing down upon his pillow-stuffed front.

Gus was getting along famously with the kids when Miss Davidson, the principal, approached him with such an expression of panic on her face that Gus feared she was about to speak his name and give him away.

"The heating plant won't run, Santa," she told Gus, "and we can't reach a furnace repairman. They all seem to be away for the holiday. It's getting awfully cold in here. What can we do?"

Glancing through the open door of Miss Davidson's office, Gus could see Matt Bergstrom, who was a member of the school board, frantically jiggling the phone hook as he tried to get a number. Sam Howard, the school's janitor, stood beside Matt, wringing his hands helplessly. Gus, heavily padded, had not noticed the cold.

This was a big evening for adults and kids alike. The walls of the school were gay with decorations. A huge tree sparkled with lights, and from its tip shone the silver star of Bethlehem. The school stage, where every year for over a quarter of a century the town's youngsters had presented a Biblical play, was decorated with star-studded evergreen wreaths.

Gus tousled Tommy Willard's mop of hair as he thought about the problem.

"Here you are, my lad," he boomed, handing the boy a present.

Turning to tiny Ann Trotter, Gus permitted a worried expression to come into his eyes. The child, her arms outstretched to take the gift Gus was offering, saw it. Her blue eyes opened wide in dismay and astonishment. This will never do, Gus thought.

"And now for you, my little lady," Gus said in

Copyrighted material

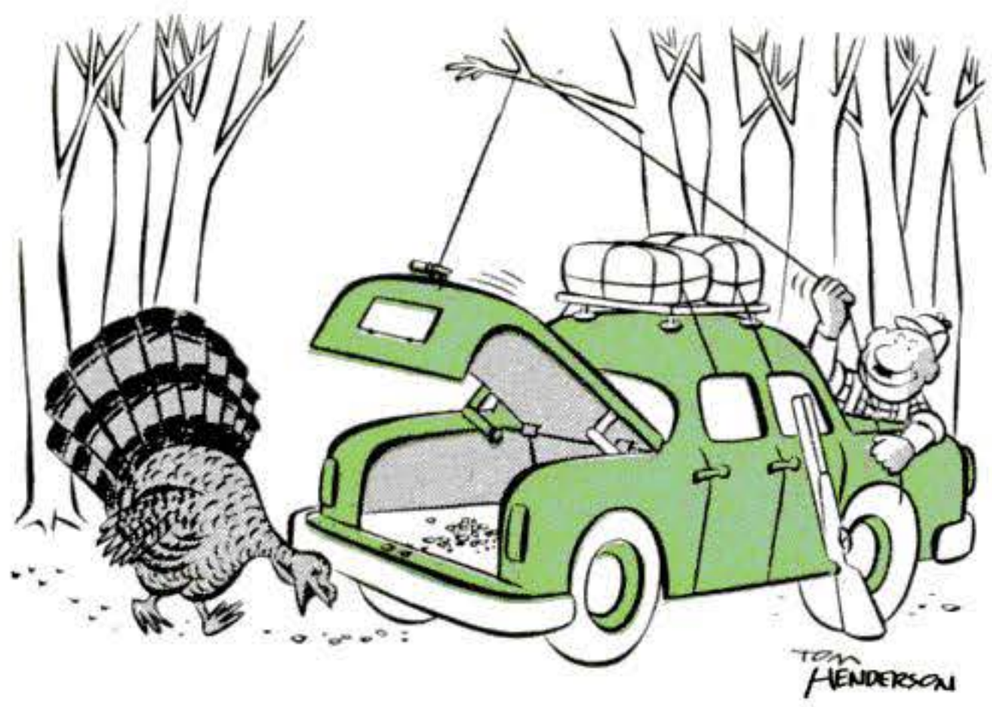
his best Santa Claus voice, boosting the tiny tot to his shoulder, "I have this doll with real hair and eyes that close."

"I'm getting awful cold, Santa Claus, and my baby is, too," she said as she cuddled the doll in her arms.

MATT Bergstrom stepped from Miss Davidson's office, and his eyes met Gus's in mute appeal.

"A nice state of affairs," someone in the audience grumbled aloud. "It's freezing cold in here."

The eyes of the adults strayed to Gus. Here was a man to whom they had been accustomed to turn in times of emergency.



Gus sighed. What could he do? He couldn't step off the stage with his presents still undistributed. Neither could the Santa Claus these kids had known for years suddenly turn into Gus Wilson of the Model Garage—the man who fixed daddy's car.

Besides, he knew little about automatically controlled oil-conversion units like the one that had been put in here. And yet, he did know something. He had been on the committee that had selected it. He had gone over its specifications rather thoroughly with the salesman. At any rate, he had to make a decision now, and he made it.

"So," Gus roared jovially, chucking little Ann Trotter under her pretty chin, "my little one is cold. Perhaps old St. Nick can fix the furnace."

"Could you, Santa?" Tommy Willard asked.

"Ho, ho," Gus cried out. "And why not? In my shop at the North Pole I fix many things."

Gus put Ann Trotter down and moved toward the basement door.

"I'll need tools," he said loudly, and his eyes sought out in the audience his helper at the garage, Stan Hicks.

GUS had fully expected that the parents and teachers would move to prevent the children from following him. Alone in the basement he could revert to Gus Wilson and work on the heating plant. But nobody made a move to prevent the shouting children from trooping along at Gus's heels.

Stan Hicks sidled out the door behind them. "I dunno what you folks are going to do," he said. "But me, I'm going after Gus's tools so Santa can do the job."

Sam Howard accompanied Gus into the basement. "I don't know anything about this gadget," he remarked sourly, "except how to turn it off and on."

Gus surveyed the ancient furnace with its gleaming conversion oil unit, feeling rising panic. On the way down he had glanced at the wall thermostat and noted that it was turned above the 70-degree mark. Yet the oil burner was silent and cold. Looking at the circle of youthful, eager faces about him, the awful realization came to him that every child in the basement was expecting Santa Claus to work wonders.

"Here, Santa," said one boy, offering his newly acquired present to Gus. "Use my tool kit—it's a dinger."

"Just the thing, just the thing, my lad," Gus boomed.

Gus located the fuse panel, inspected the fuses. He traced the copper fuel line from the burner to where it split into two lines leading through the cement wall to buried fuel tanks. Each line had its shutoff valve and individual sediment bowl. The right tank, Gus noted, was shut off, the valve on the left tank wide open.

"I brought your tools from your sleigh, Santa Claus," Stan Hicks kidded Gus as he approached with Gus's small emergency tool kit.

[*Continued on page 232*]

Copyrighted material

Prefab kits, quickly assembled, give you a choice of

One-Evening Workbenches

By Kenneth Murray

WOULDN'T you like a fine new workbench for Christmas? Then here's a tip:

Just leave this magazine open to this page, where your wife is sure to see it. Maybe she'll take the hint and build you one.

Nobody's kidding. Like a lot of unfinished furniture, workbenches now come prefabbed—all the parts cut and fit-

MECHANICS *and* HOMEBUILDING

Digitized material

ted for easy assembly. The little woman who has bolted together chests, dressers and kiddy furniture for the home is in good training for the job.

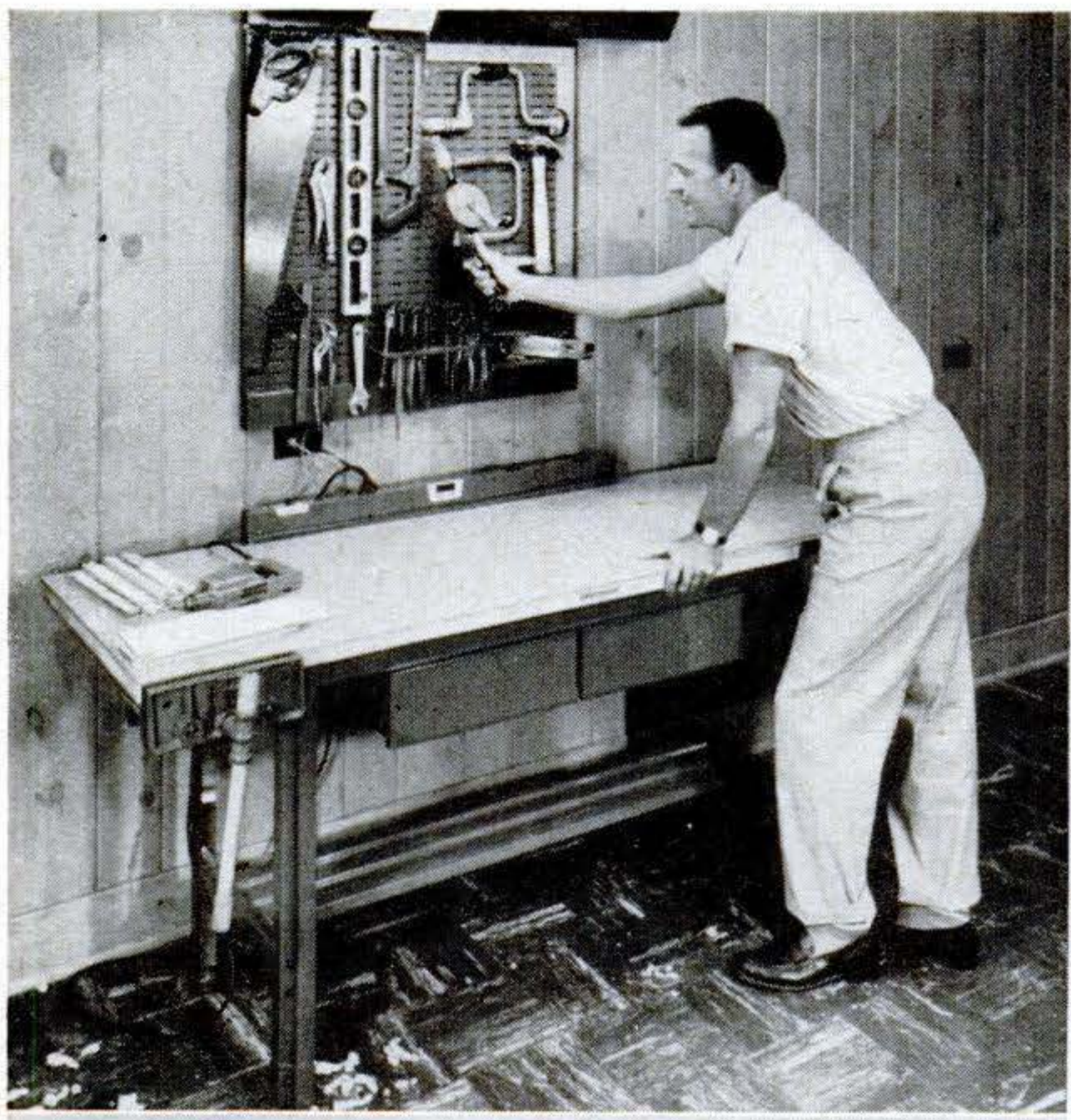
If she fails to take the hint, or if she's not the hammer-and-saw type, you may want to buy the kit yourself. Whatever you buy, you should be able to put it together in a single evening.

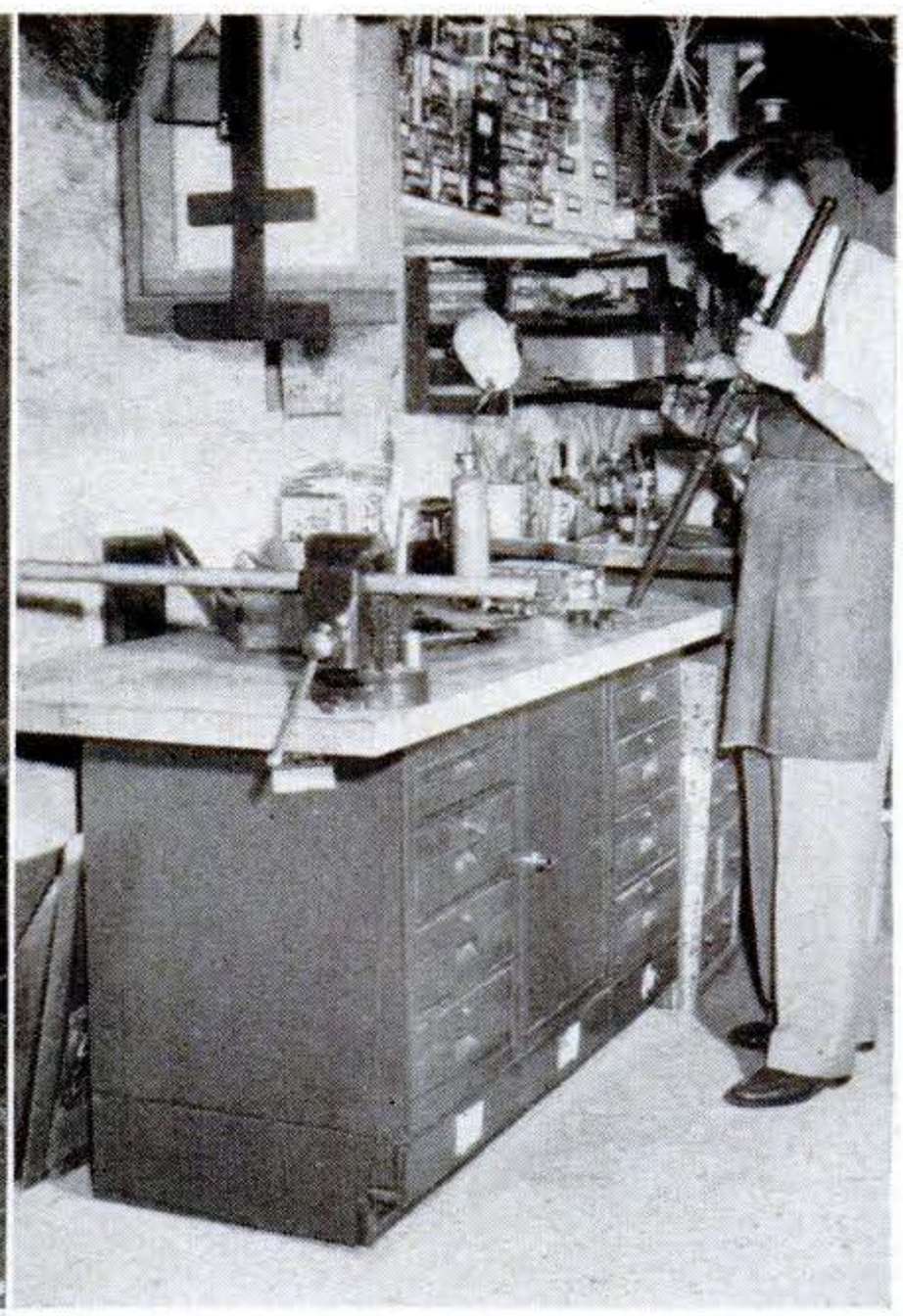
Four hours, twenty bucks. That's the story of the bench I ordered by mail. All pieces were cut to size. Dadoes, rabbets and joints were ready-made. Four hours from the time I picked up the instruction sheet, my bench was ready for use. Building it from scratch would have taken me three times as long. The kit cost me about $20, plus shipping charges.

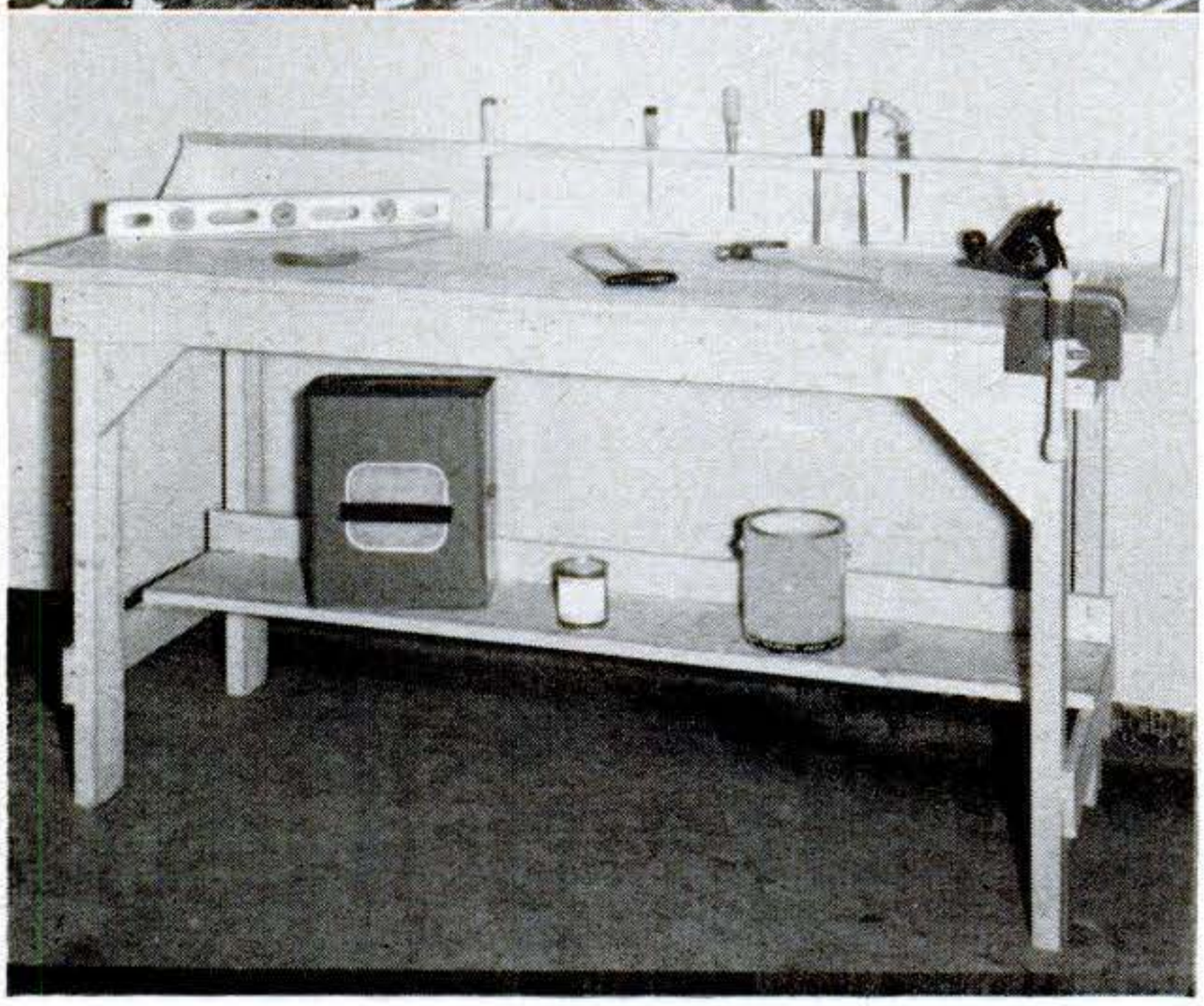
You can pay more, or less, for a kit workbench.* (One manufacturer turned out a maple-topped model for the carriage trade at $150, but it never caught on.) Some are made entirely of wood, some entirely of metal and some are a combination.

Where to buy. Enterprising lumber

Types of benches that come in kits—and where to get them





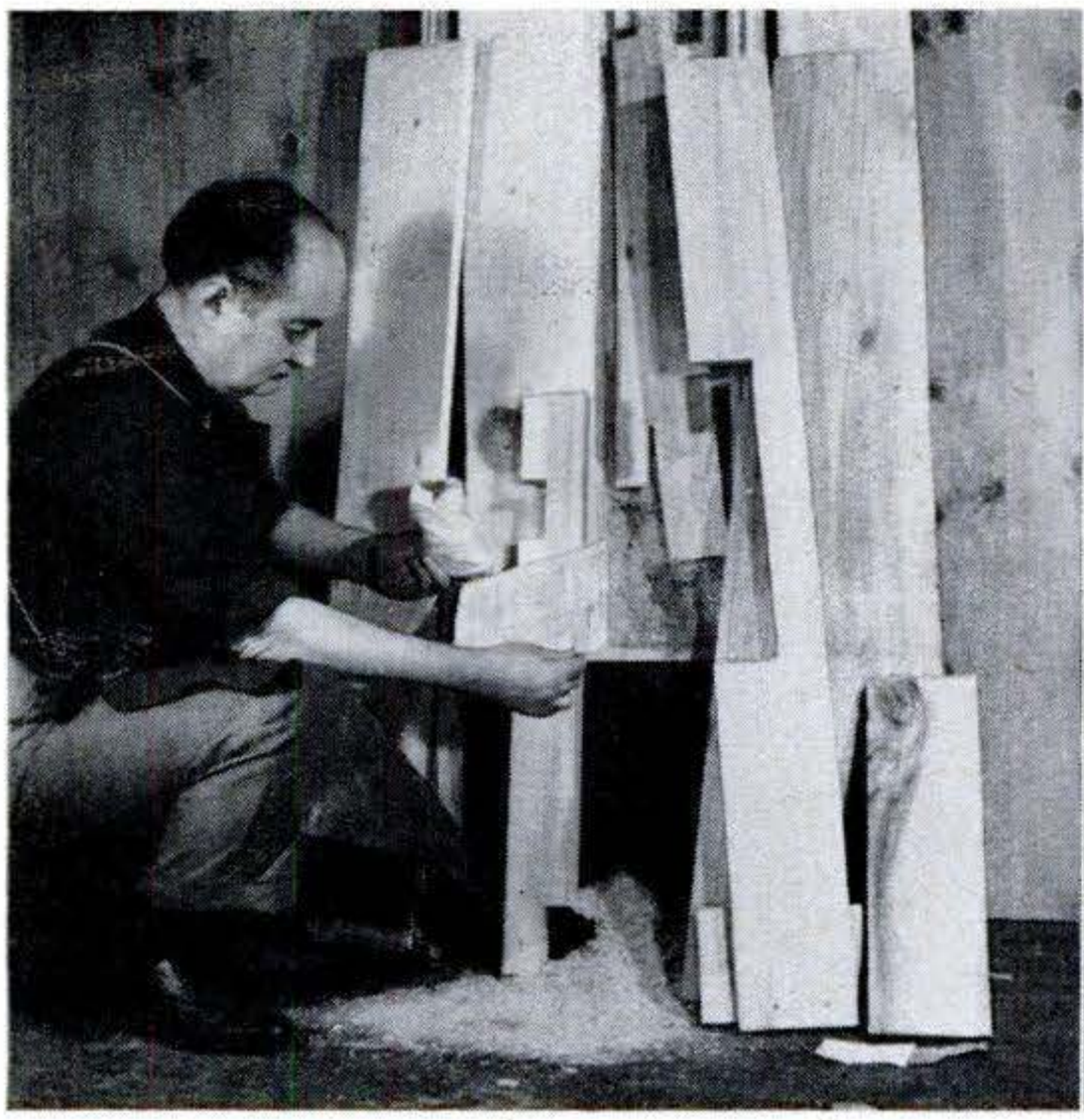


YOU CAN CHOOSE from these types. Benches built entirely of wood like the one at left still remain a favorite. But metal also is now widely used by commercial makers—sometimes for just the frame, with a wood top like the one at the upper left; sometimes for the top, too. The cabinet type above, usually made mostly of metal, offers lots of storage space.

**Workbench kits are produced by many makers, among them the following: Anchor Sales Corp., 350 37th St., Brooklyn, N.Y.; Belson Mfg. Co., N. Aurora, Ill.; Benchcraft, 3669 Olive St., St. Louis 8; Coast Lumber Co., 1041 Dixwell Ave., Hamden, Conn.; Frontier Mfg. Co., 10600 Hines Blvd., Dallas; Hallowell Division, Standard Press Steel Co., Jenkintown, Pa.; Harris Bros., 1349 W. 35th St., Chicago 9; Lumidor Mfg. Co., 4801 E. 50th St., Los Angeles 11; Lyon Metal Products, Aurora, Ill.; Mohawk Lumber Co., 14525 W. Chicago Blvd., Detroit 28; Montgomery Ward; Sears, Roebuck & Co.; Structo System, Elyria, Ohio; Sturdi-Bilt Steel Products, 2501 Peterson Ave., Chicago 45.*

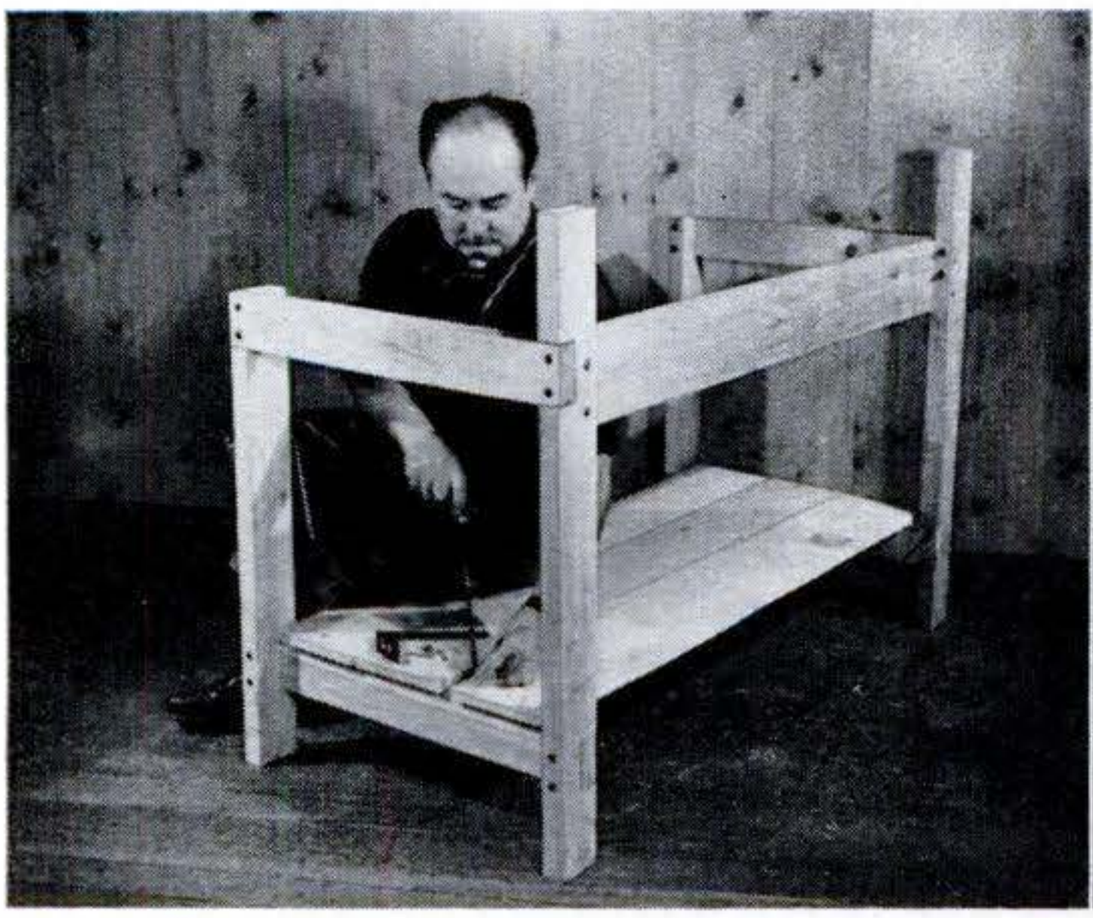
Copyrighted material

How one workbench goes together

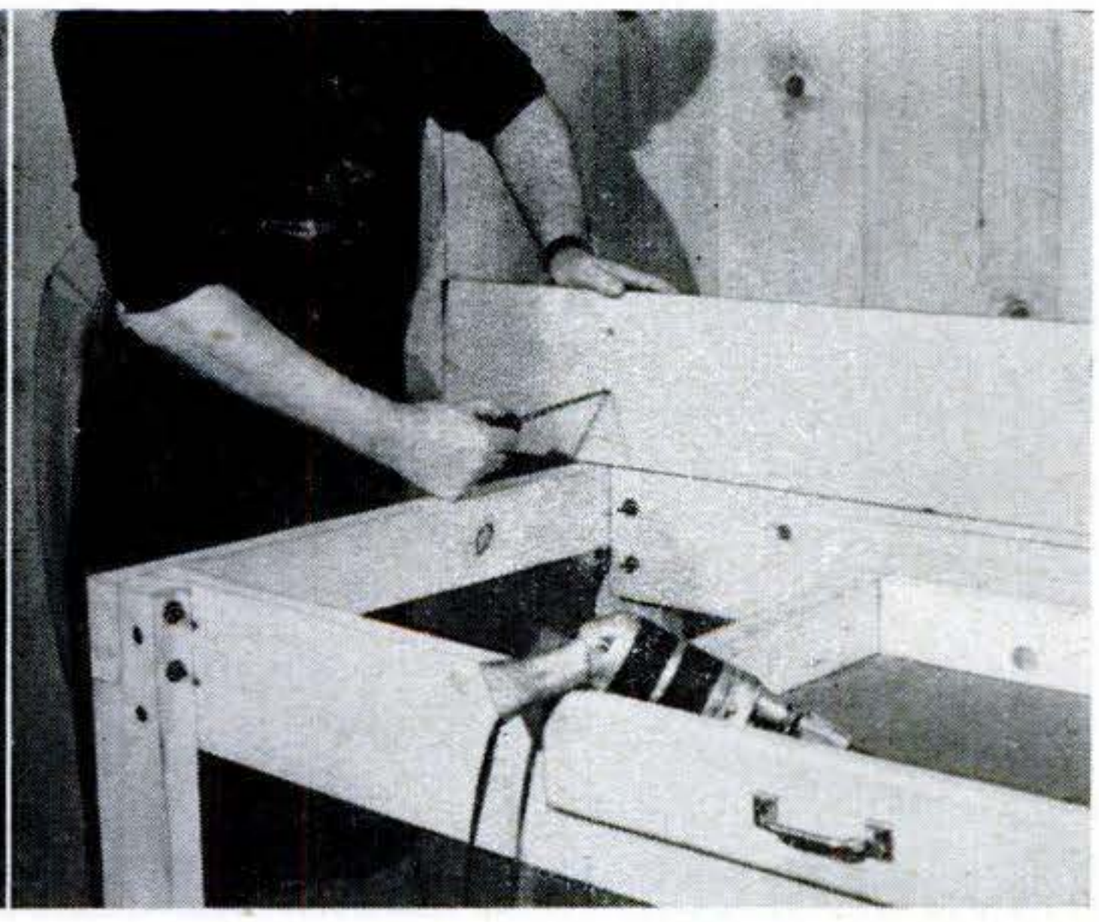


PRECUT WOOD comes in a waterproof wrapper. Hardware is packed in the ready-made drawer.

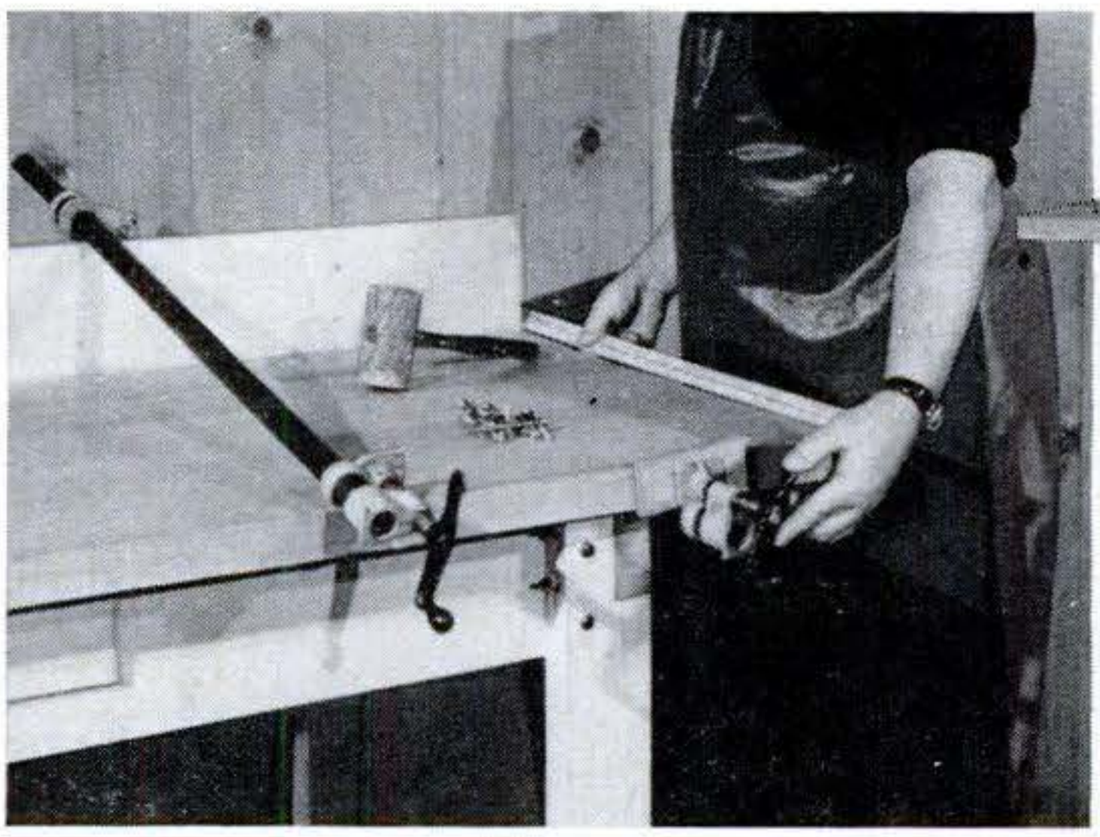
FIRST STEP is bolting together four pieces for each leg end. Bolts fit predrilled holes.



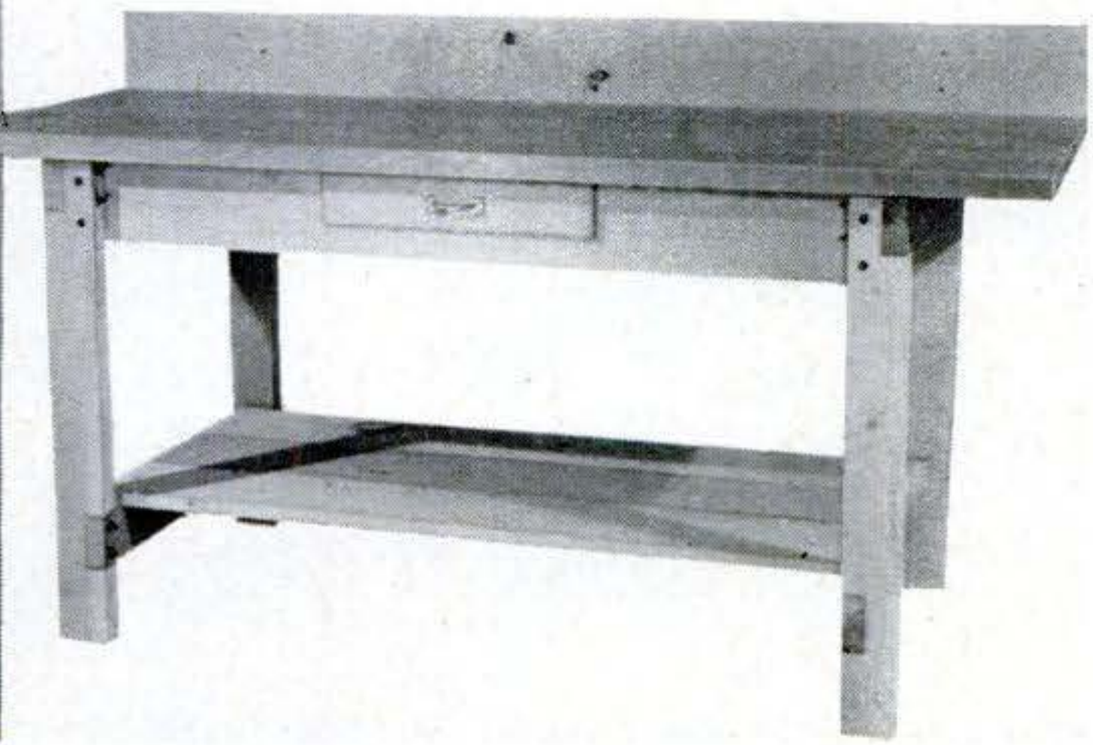
BENCH STANDS on its own legs when back rail is bolted on. Shelf boards are screwed on next.



FRONT RAIL and drawer guides go in next, and backboard is screwed to the top of rear legs.



FIVE PIECES of tongue-and-groove lumber make up the top. Clamps are useful but not vital.



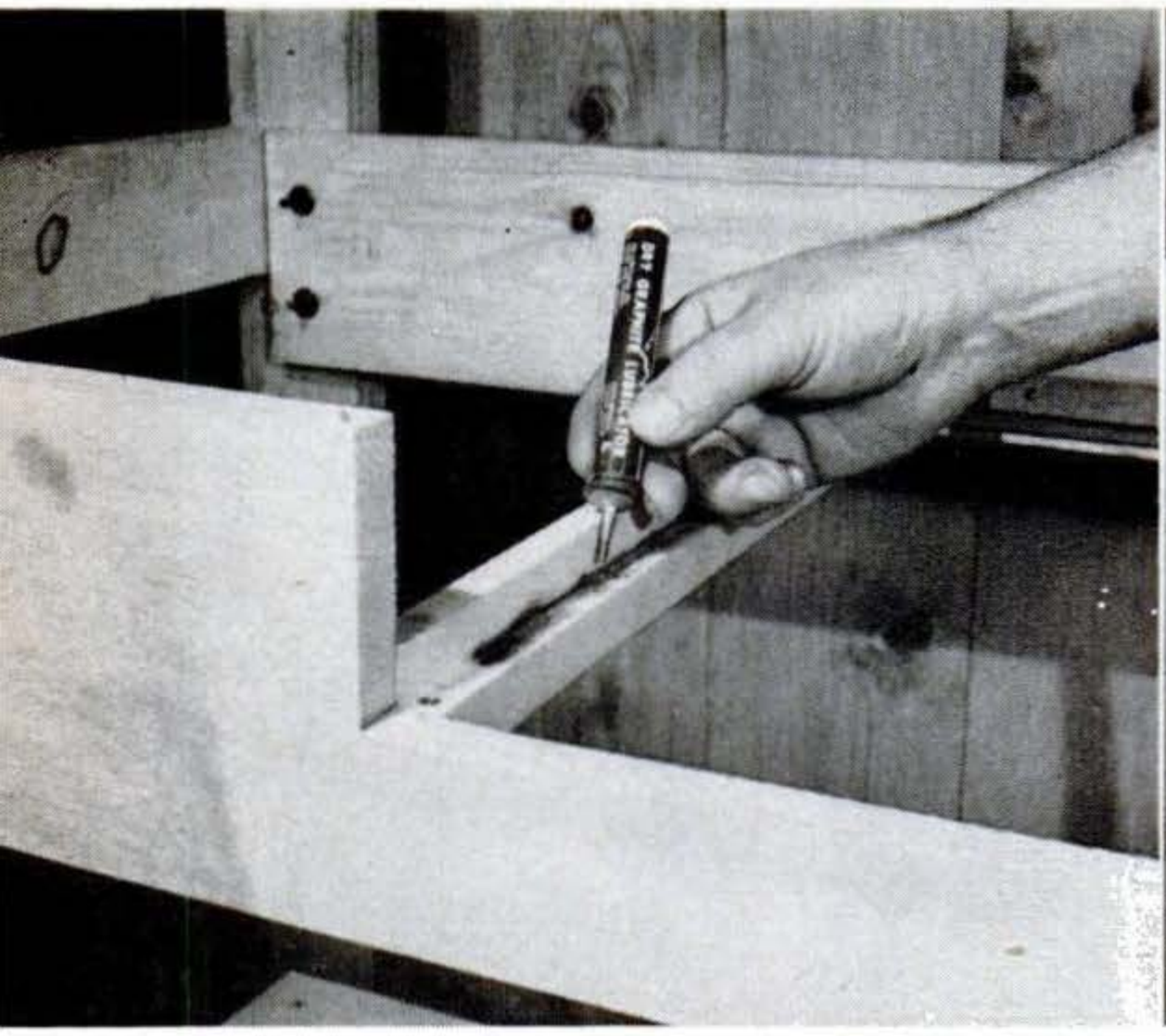
READY FOR WORK as it is, the bench could be fitted with extra shelves, or even enclosed.

Copyrighted material

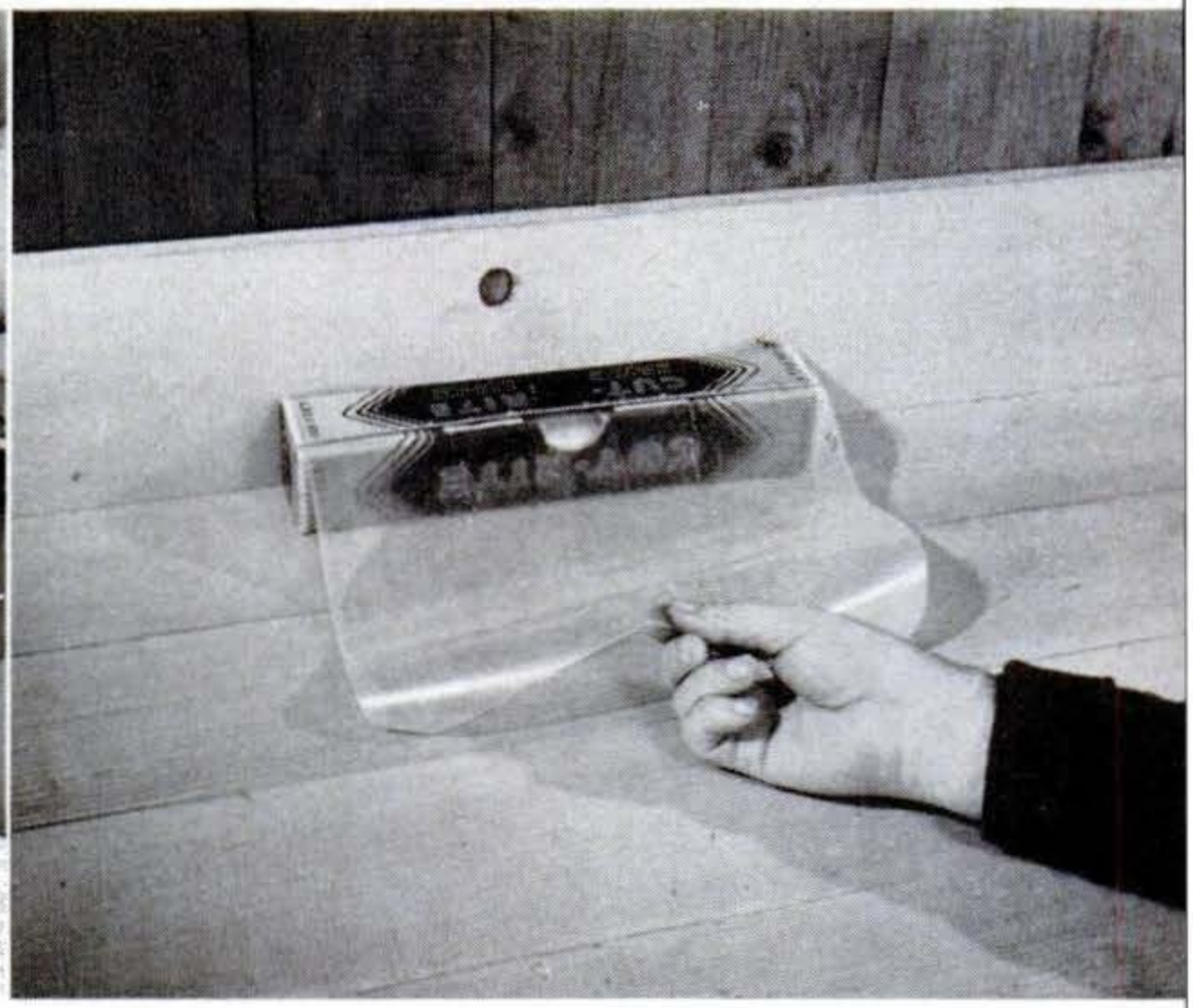
yards assemble workbench kits of their own. These run all the way from just cut lumber to all-out prefab jobs. Other yards and stores may handle kits that are distributed on a regional basis only. You can also order by mail.

Any kit will cost you more than the raw stock. But your time is worth money, too, and a kit can save you shop time that you can put to better use on other jobs. Also, overestimating the amount of wood needed, or cutting one piece short, can cost you more than the difference. When you buy a kit, the figuring has all been done for you. All you have to do is put it together and enjoy it.

These simple dodges make a workbench even more useful



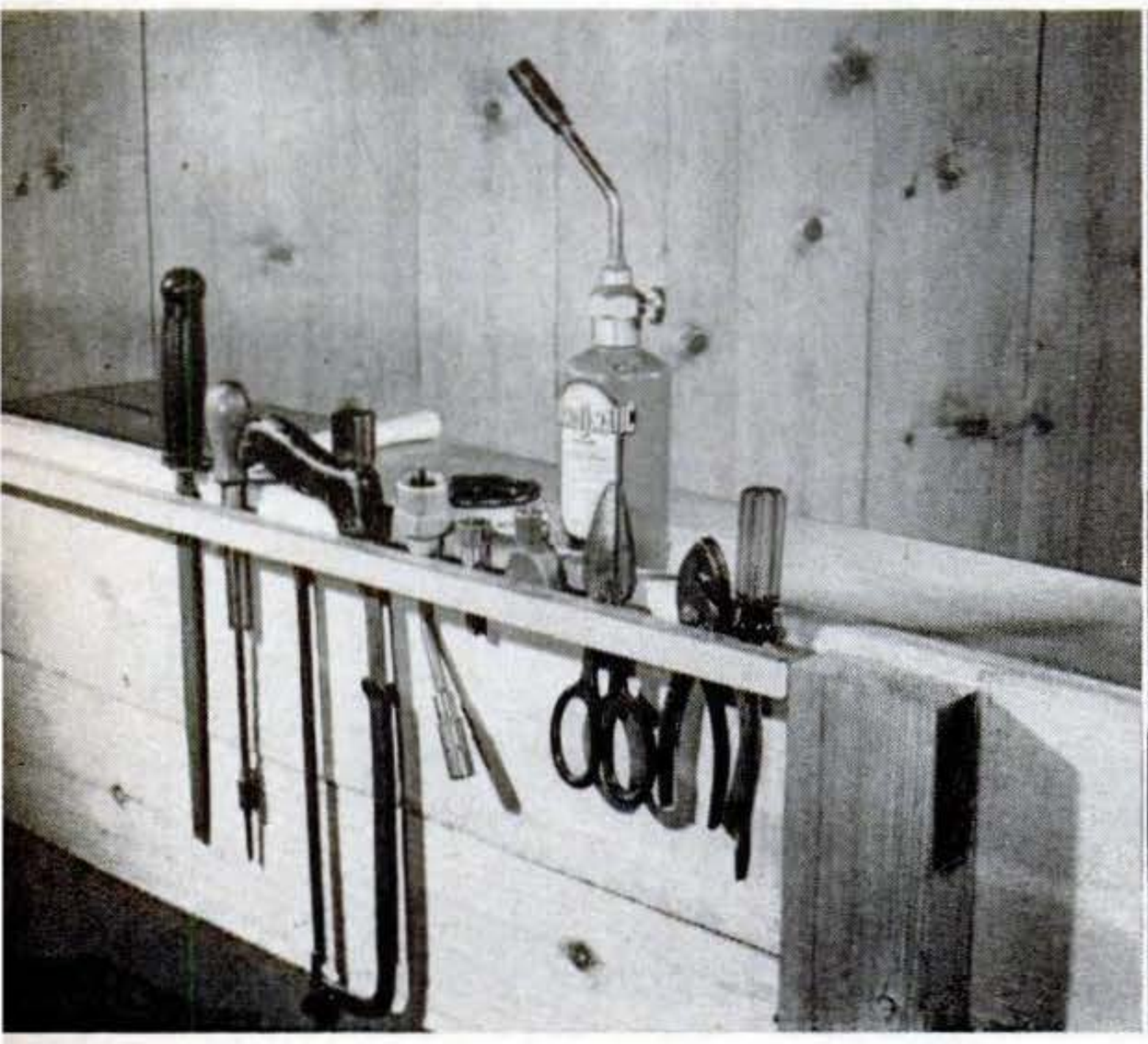
BENCH DRAWER will have roller-smooth action, even when heavily loaded, if dry graphite or grease stick is applied to the runner faces.

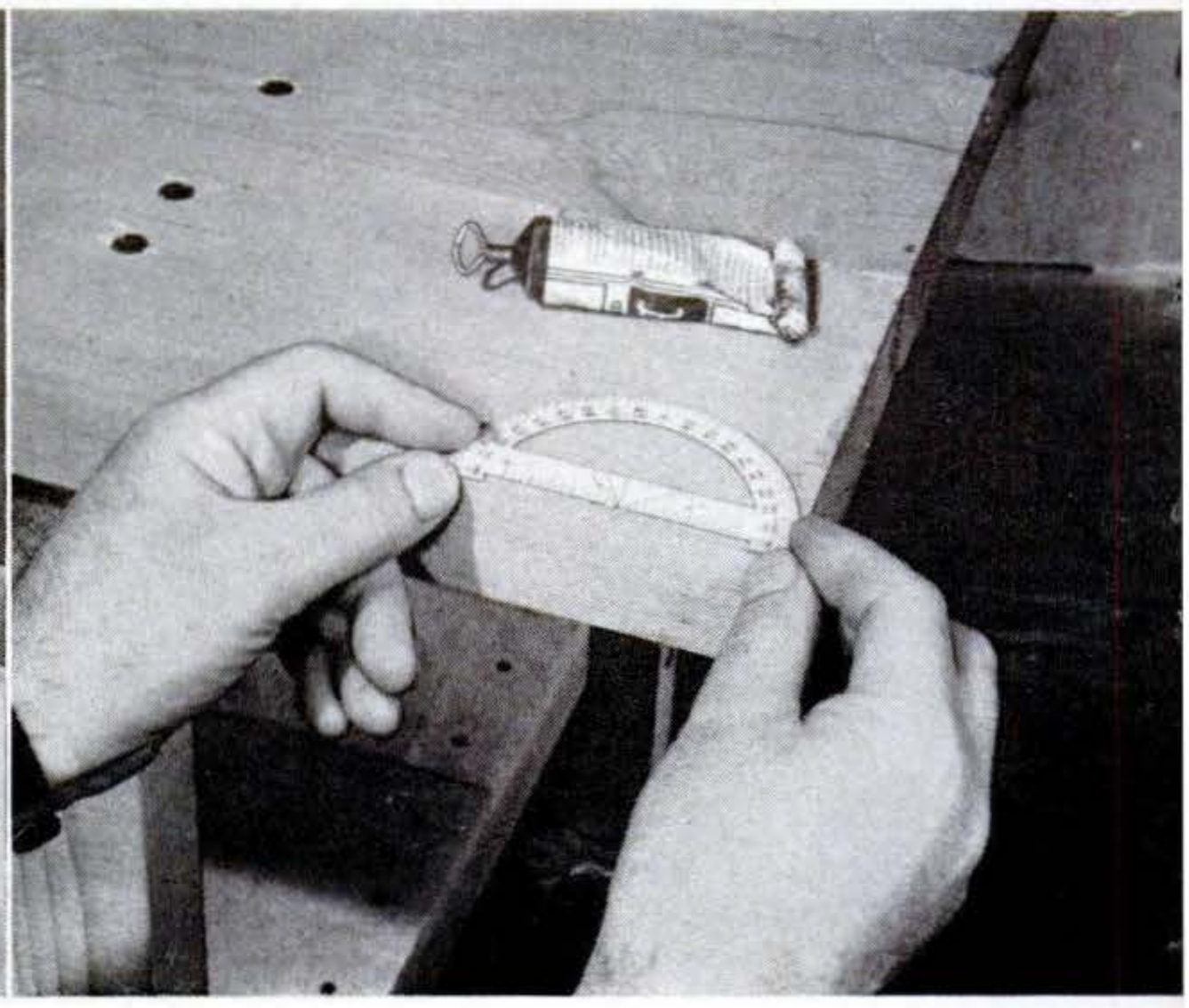


BEFORE GLUING, mask the working area of your bench top with waxed paper. A dispenser can be tacked to the workbench backboard like this.

BACK VIEW OF BENCH shows how a 1″-square wood strip toenailed between backboard uprights makes a tool hanger. The slot is 1″ wide.

SMALL METAL PROTRACTOR, cemented to a corner of the bench top, enables you to check angles quickly, helps prevent building errors.



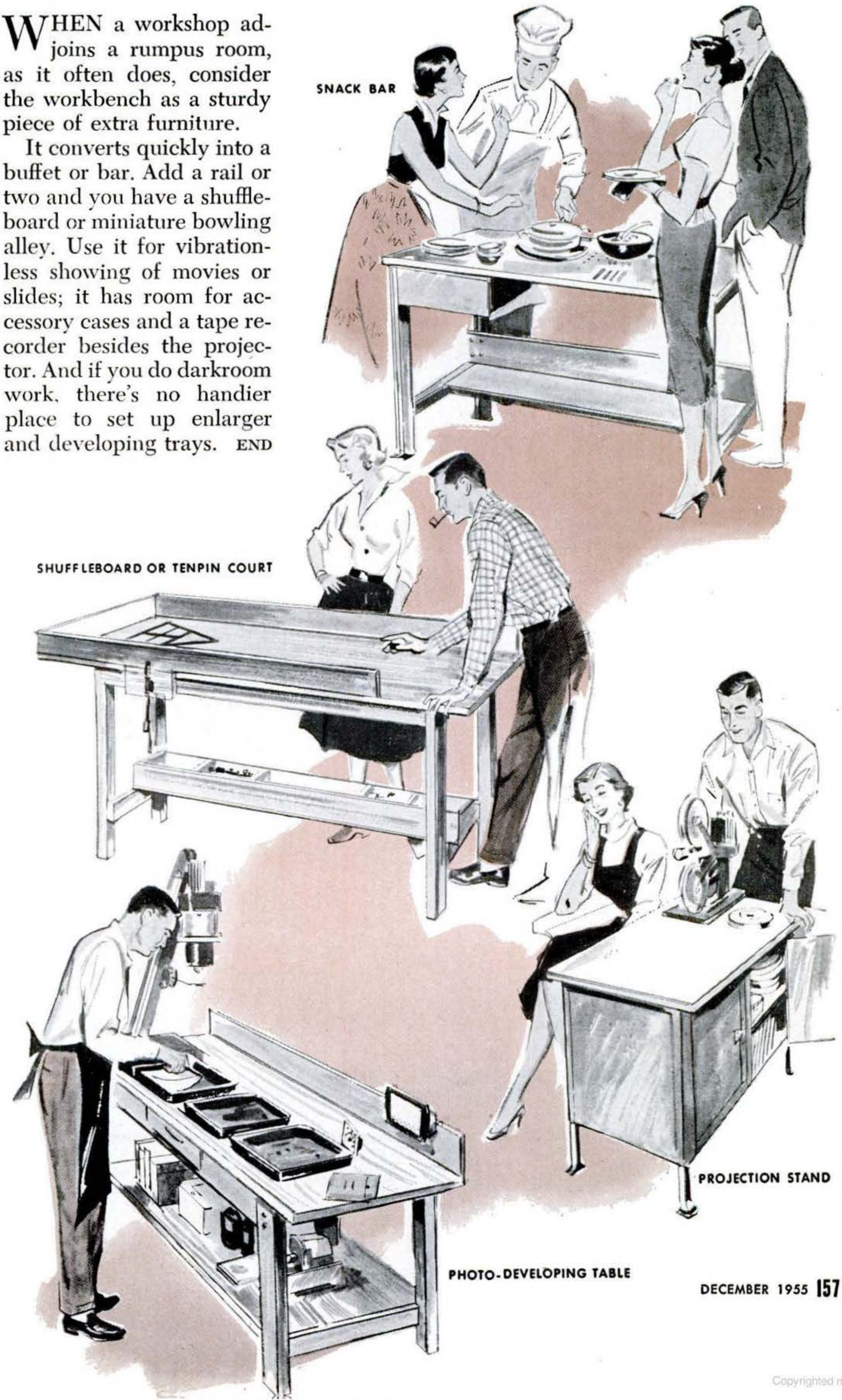


Copyrighted material

Clear off the tools and put your bench to recreation uses, too

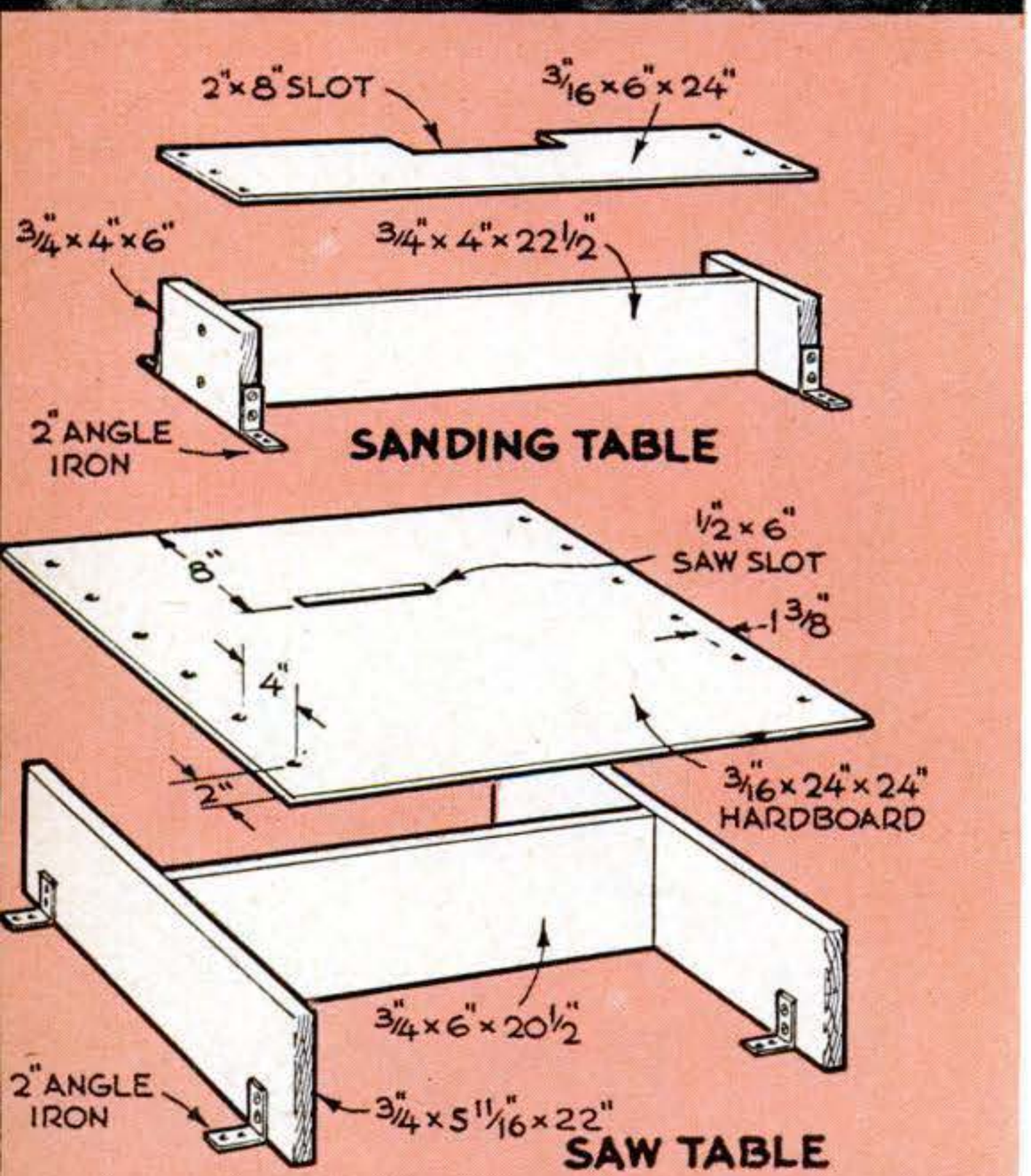
WHEN a workshop adjoins a rumpus room, as it often does, consider the workbench as a sturdy piece of extra furniture.

It converts quickly into a buffet or bar. Add a rail or two and you have a shuffleboard or miniature bowling alley. Use it for vibrationless showing of movies or slides; it has room for accessory cases and a tape recorder besides the projector. And if you do darkroom work, there's no handier place to set up enlarger and developing trays. END



Copyrighted material

Drill Accessories You Can Make

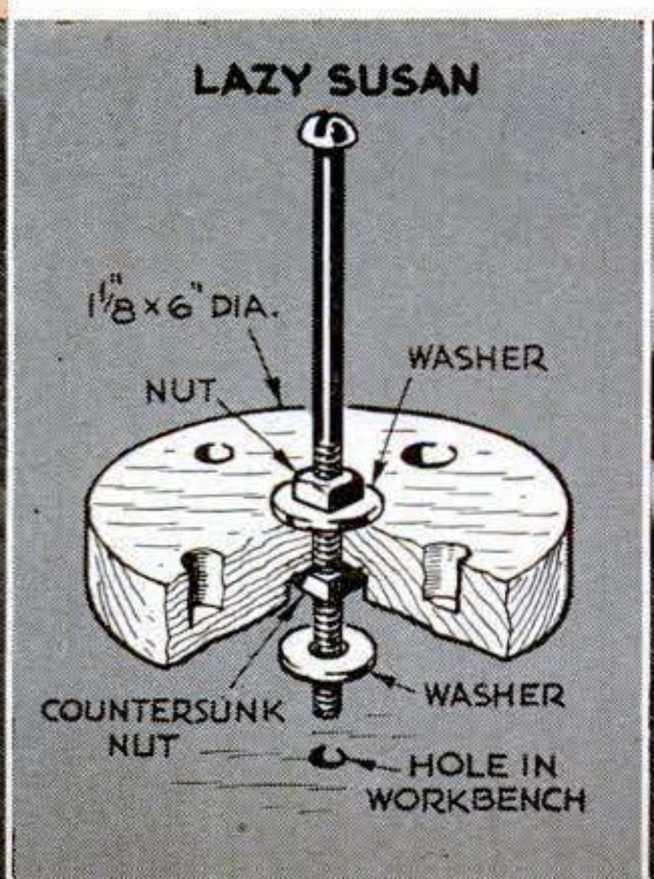


YOU take one big step toward getting the most from an electric drill by buying a horizontal stand. You can take another big step by building your own sanding and saw tables to go with the stand. The tables, as well as a handy Lazy Susan tool rack, might all be turned out in a single evening.

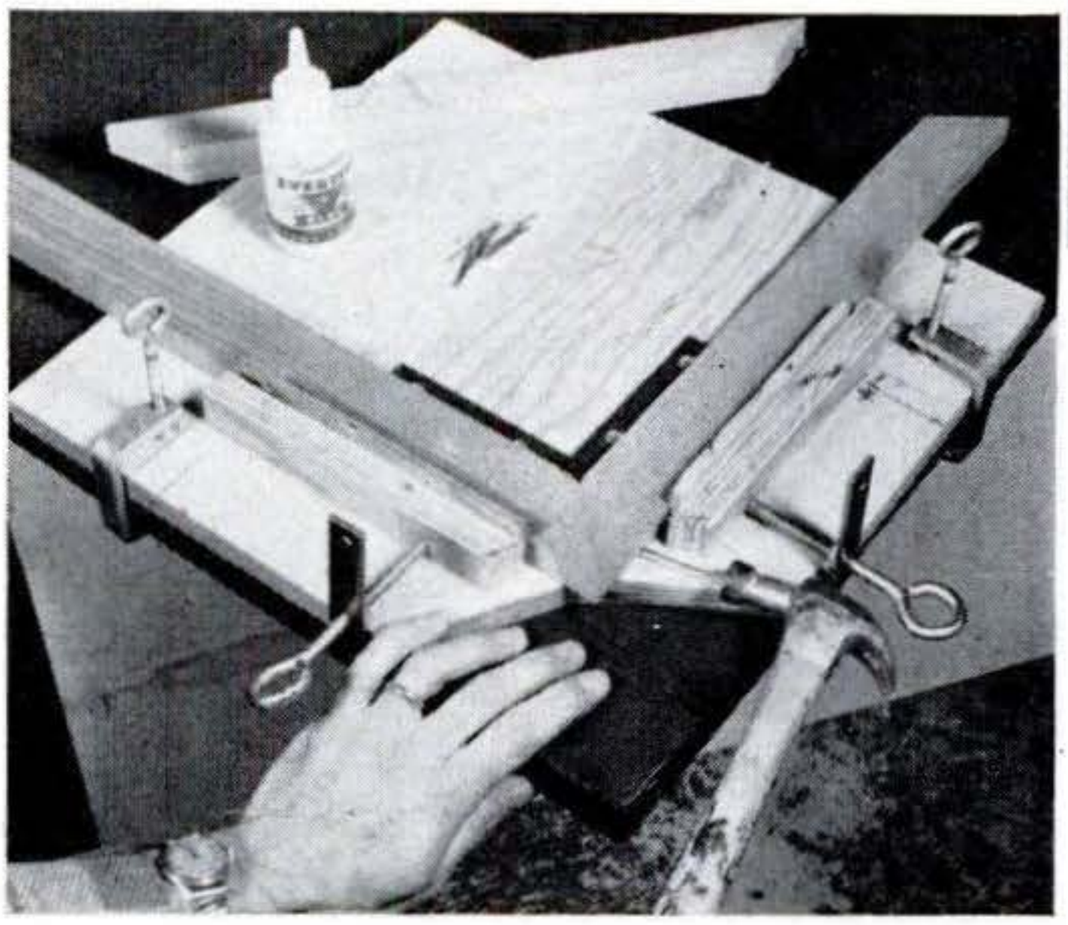
Sanding table. Fasten the drill stand to the workbench after blocking it up (if necessary) to place the drill-chuck center 5″ above the bench top. Make an H-shaped frame like the one shown at the upper left, using scrap wood. Screw on a hardboard top with a recess cut in one side for a 6″ sanding disk. Position the table so that the sanding-disk face is ¼″ from the parallel edge of the recess and anchor it down with angle irons.

Saw table. Here again, use an H frame to support a hardboard table top. Instead of a recess, this table has a slot for a 4″ saw blade. Make the table 5⅞″ high—this will give you a 1⅛″-deep cut with the same drill setup used for the sander. A slight table-top overhang lets you clamp on a pine strip for a rip fence.

Lazy Susan tool stand. Turned or sawed to 6″ diameter, a scrap of pine 1″ or more thick makes a handy revolving stand for electric-drill accessories. Drill holes for the tool shanks 1″ in from the edge of the disk and not quite through. At the center of the stand drill another hole for a long ¼″ bolt which serves as a pivot and handle. Countersink the bottom end of this hole so that the nut holding it in place on the bolt can be recessed almost flush with the stand. With a washer for a bearing, insert the end of the bolt in a hole in the work table.



CLAMP BRACKETS are 4" metal angles notched into underside of plywood so that base lies flat. Drill holes to take ¼"-by-4" eyebolts, and thread bolts into nuts that act as bearings.



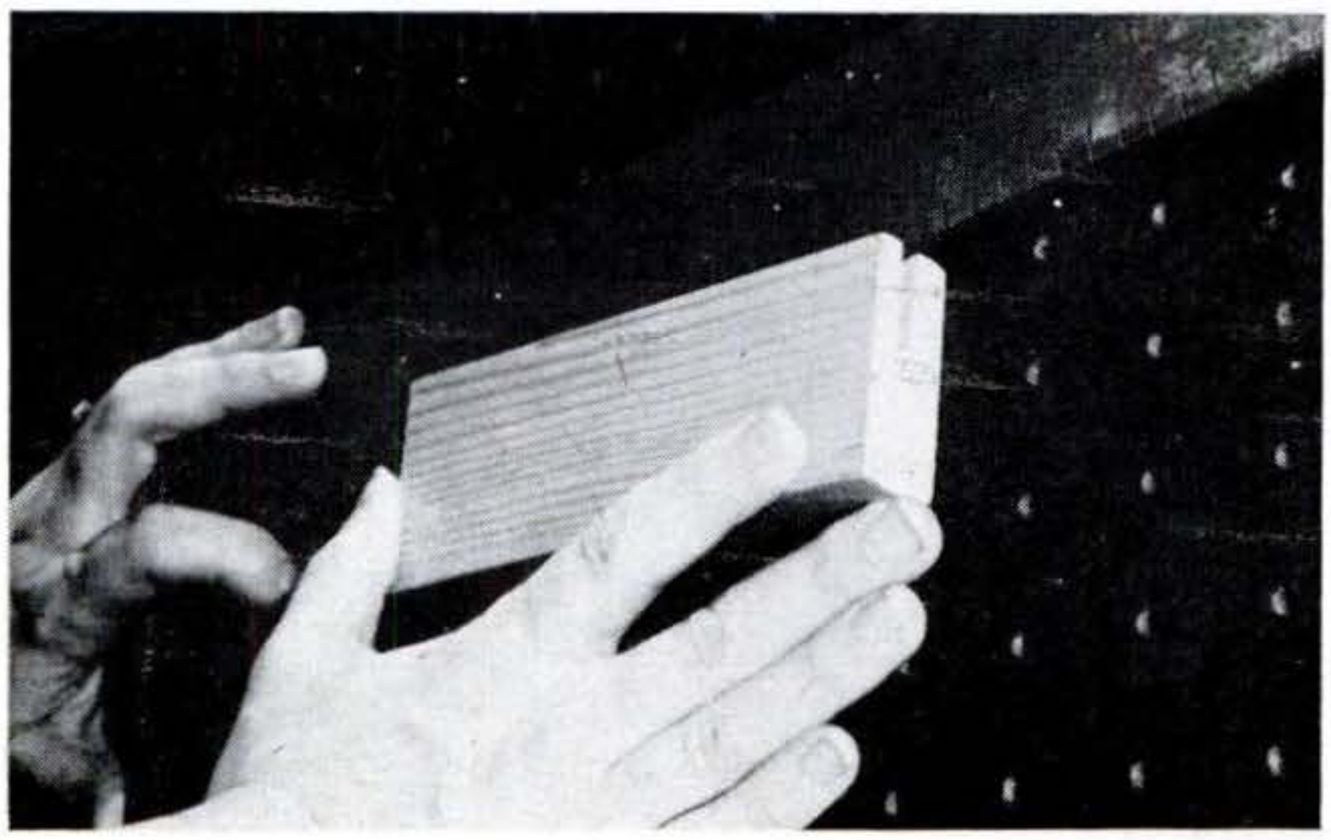
TO EXPOSE JOINT for easy nailing, corner is cropped off on 5" radius from corner point. Eyebolts are tightened against wood blocks that are faced with sandpaper strips to prevent shifting.

Wooden Jig Clamps Miter Joints

You need four hands to assemble picture frames or other mitered joints. This homemade clamping rig will do the job of two of them for you.

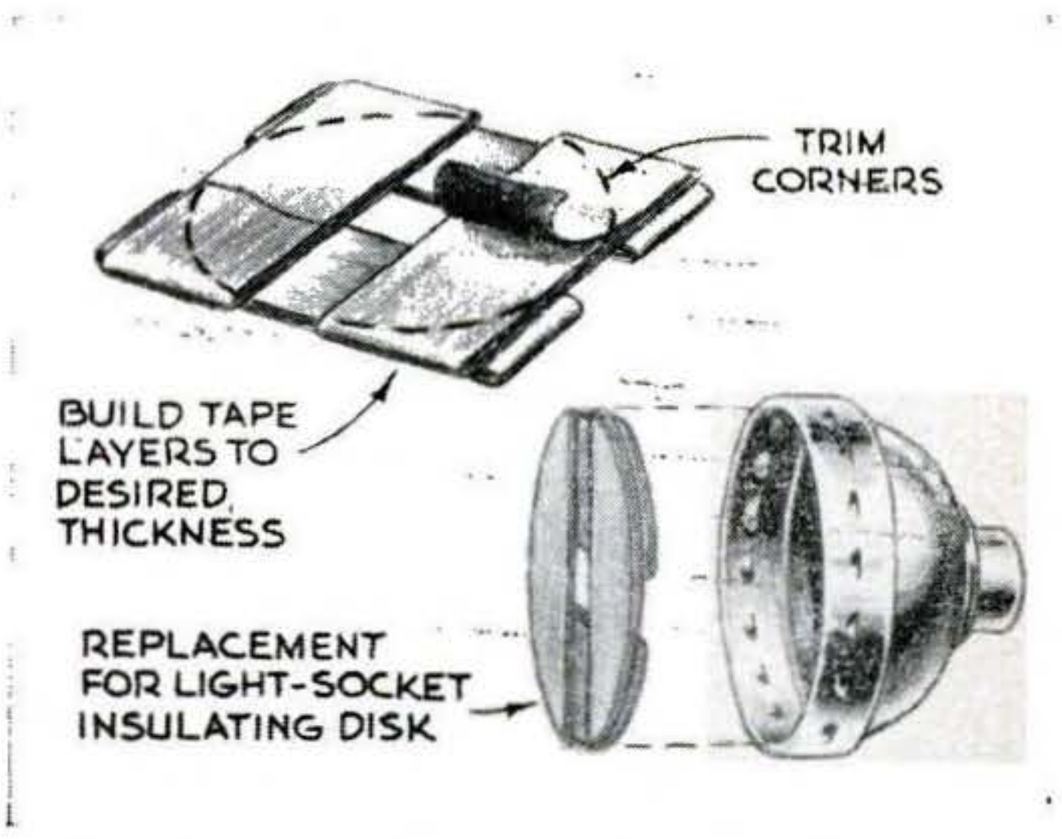
I used a 16"-square scrap of plywood for the base and screwed a smaller square on top, about 4" in from each forward edge, to serve as a right-angle stop block. A flat angle plate screwed to the front corner of the stop block prevents wear and insures a 90° angle.

Two eyebolts, acting as screw jacks, force the mitered pieces firmly against the stop block so that you can glue and nail them together without their shifting. If the bearing nuts turn with the eyebolts, wedgelock them with metal shims underneath. The jig can also clamp butt and other joints and join different widths of wood.—*Paul Corey, Sonoma, Calif.*



Square Hangs on Split Block

A WOOD block, grooved along the top edge, makes a snug tool-board holder for hanging up a large, awkward framing square. Fasten the block, in this case to perforated board, with wood screws from the back.—*Frank A. Javor, N. Bergen, N. J.*



Tape Forms Insulating Washers

NONCONDUCTIVE washers and spacers can be made to almost any size, shape and thickness from electrician's tape. Square off strips around a center hole, add layers for desired thickness, and trim the washer to shape.—*Charles H. Hardy, Los Angeles.*

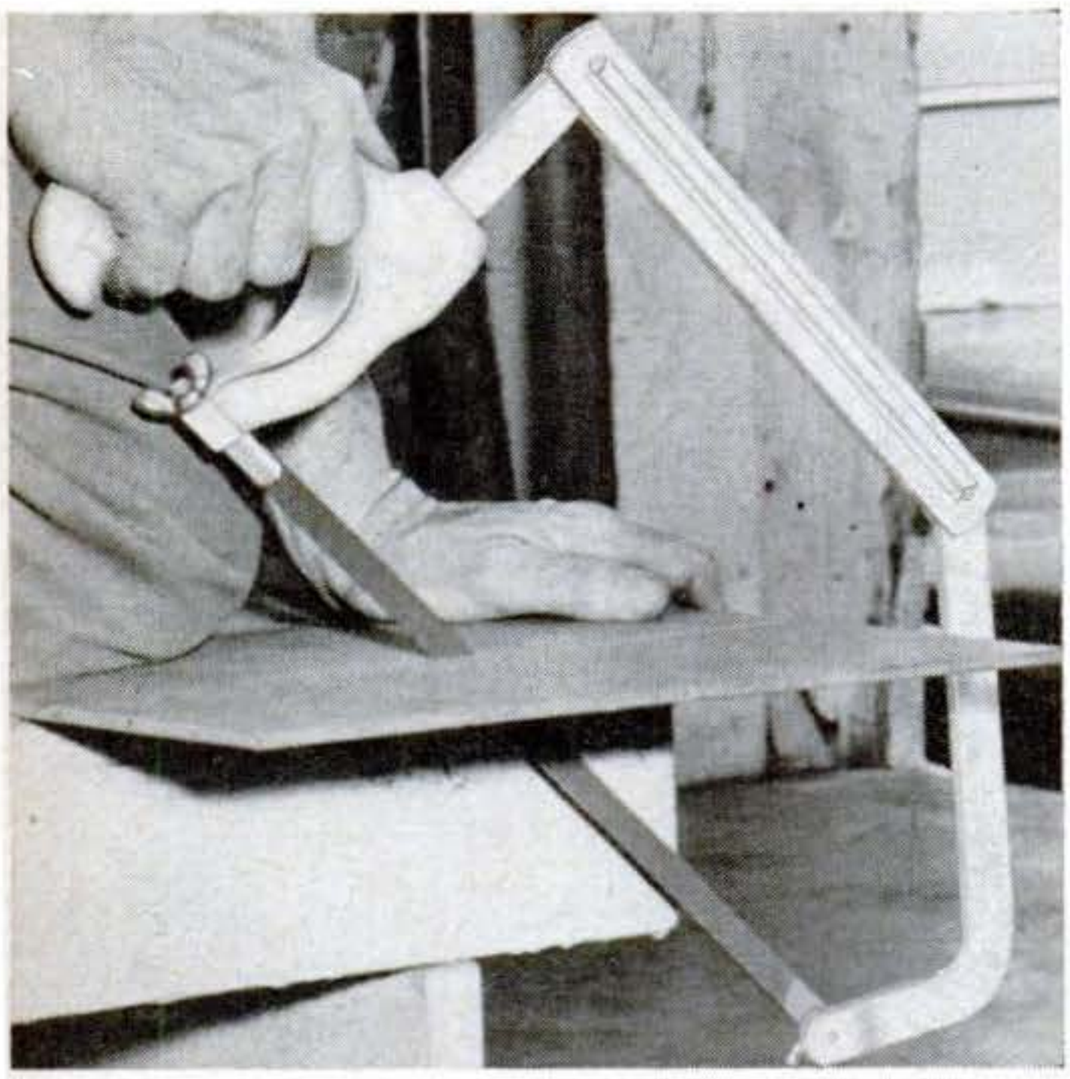
Copyrighted material

New Tools

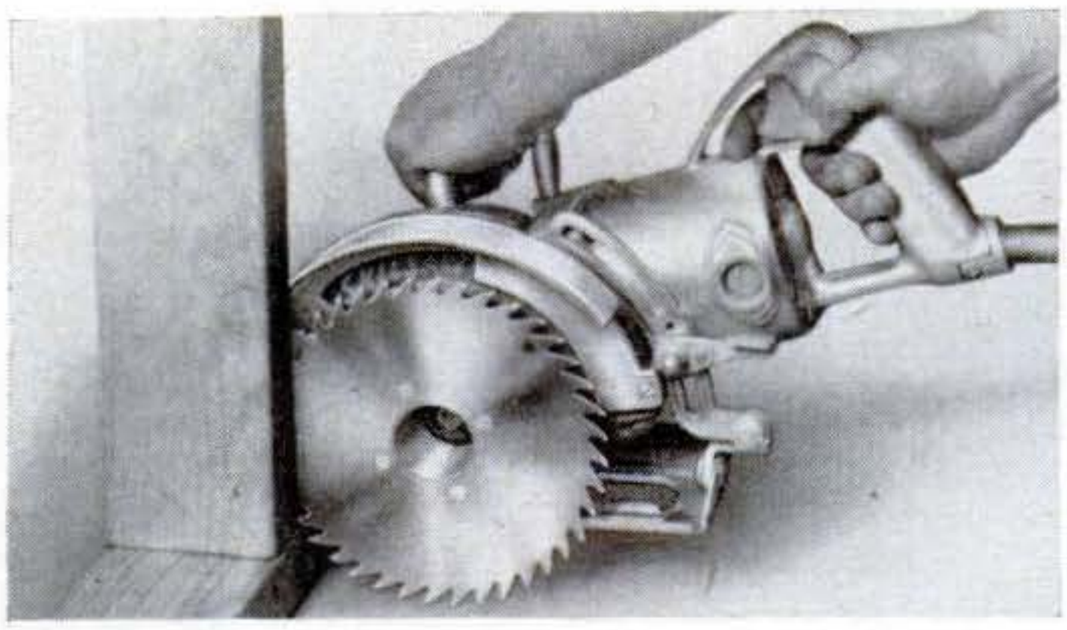
1. Seesaw Arbor Changes Tools. You can change over from sawing to planing in a trice on this husky tool. The trick: a single-wheel arbor control that simultaneously raises the 8″ tilting-arbor saw blade and lowers the 4″ jointer head, or vice versa. The 10″ tilting sanding disk at the side can be removed and a flexible shaft, for auxiliary tools, attached in its place.

2. Wrench Handle Bends into Corners. This flexible wrench gets into tight places crowded with pipes. A ratchet handle lets you set the jaws firmly around the work for a good pulling position. Interchangeable jaws can be fitted on the Handi-Flex pipe wrench by removing a pin that separates the head from the handle.

4. Hammer Head Changes Faces. One hammer can do many jobs when you snap different faces—aluminum, brass, copper, nylon or plastic—into its head. A countersunk spring pin locks them in. Heads come in aluminum for light work, or steel for heavy; handles are non-slip or smooth finish.



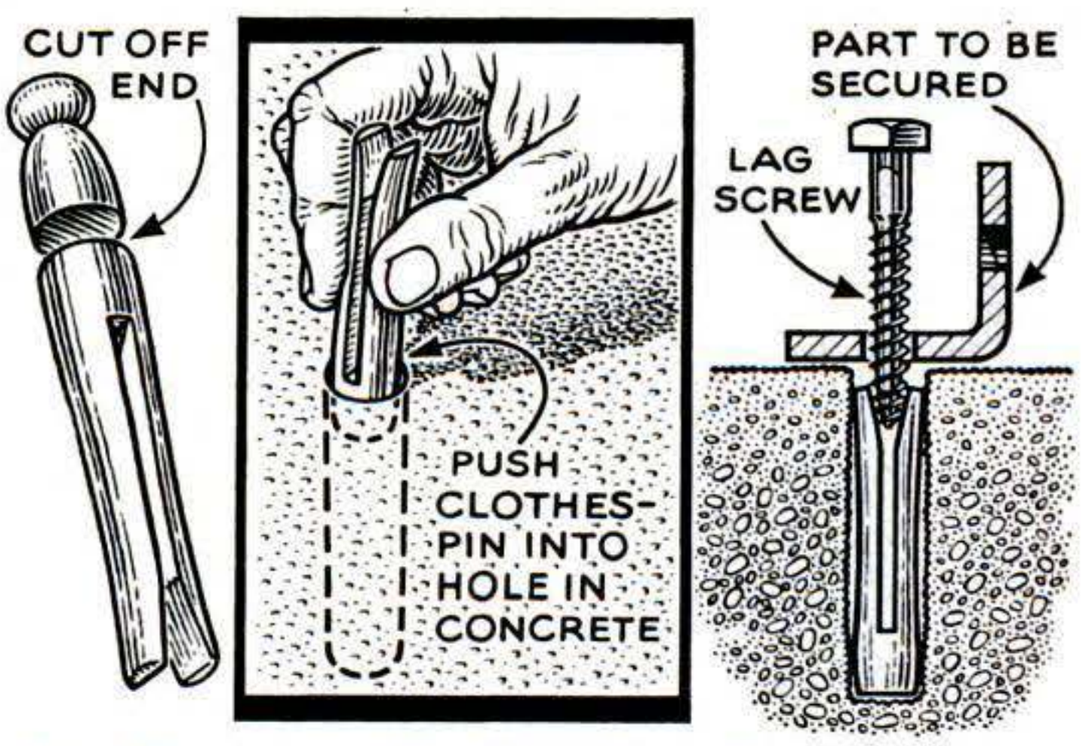
3. Hacksaw Expands for Long Cuts. When you pull up on the back brace, this hacksaw expands to a 7″ height for making deep cuts in anything from thin metal to large-diameter pipes. Called the Hi-Lo, the new saw also features a knuckle guard on the aluminum pistol-grip handle.



5. Electric Handsaw Cuts Flush. First of a series of blades for flush-cutting with an electric handsaw, this blade adapts the No. 77 Skil Saw for such cutting of studs, beams, floor joists, rafters, door plates, windows, door framing and other jobs. The manufacturer plans to make these blades for all electric handsaws. The new blade is 7¼″ in diameter with a riveted hub for mounting. An aluminum guard screws on.

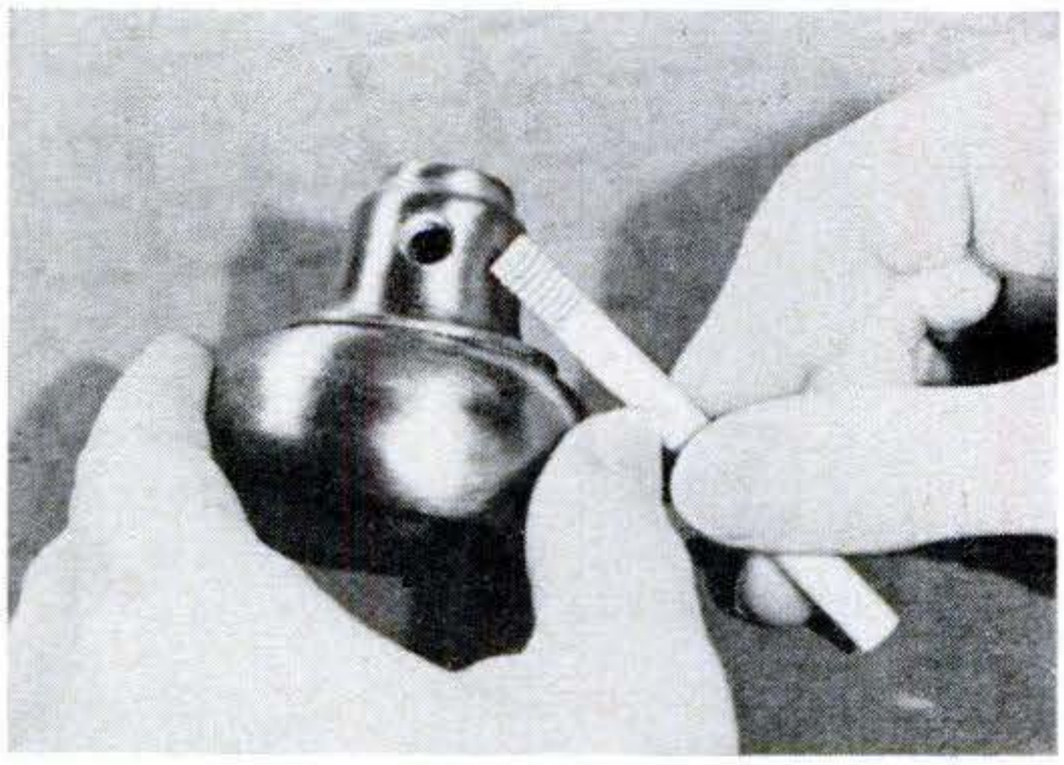
Further information on these tools can be obtained from: 1. Yates-American Machine Co., 701 Fourth St., Beloit, Wis.; 2. Tedd Products Co., P.O. Box 1621, Rockford, Ill.; 3. Mansfield-Zesiger Mfg. Co., P.O. Box 212, Cuyahoga Falls, Ohio; 4. Hi-Lok Mfg. Co., 1625 Massillon Rd., Akron, Ohio; 5. Barnes Blade Co., 16249 Colorado Ave., Paramount, Calif.

Copyrighted material



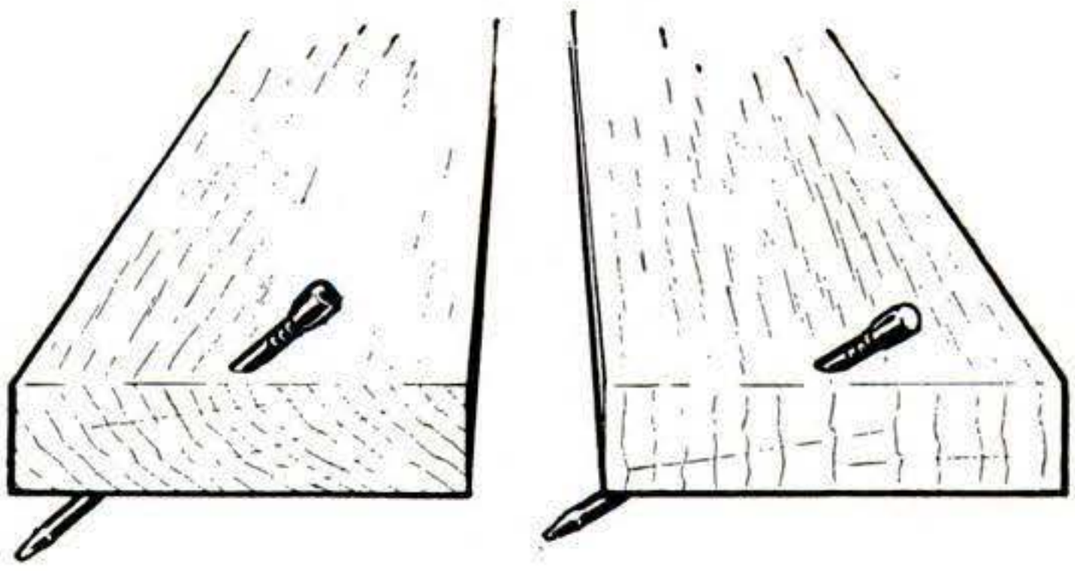
Clothespin Holds Lag Screw

NEED a good expansion shield for holding a lag screw in concrete? Saw the head off a wood clothespin and drop the pin, ends up, into a hole drilled in the concrete. —*Stanley Clark, East Bradenton, Fla.*



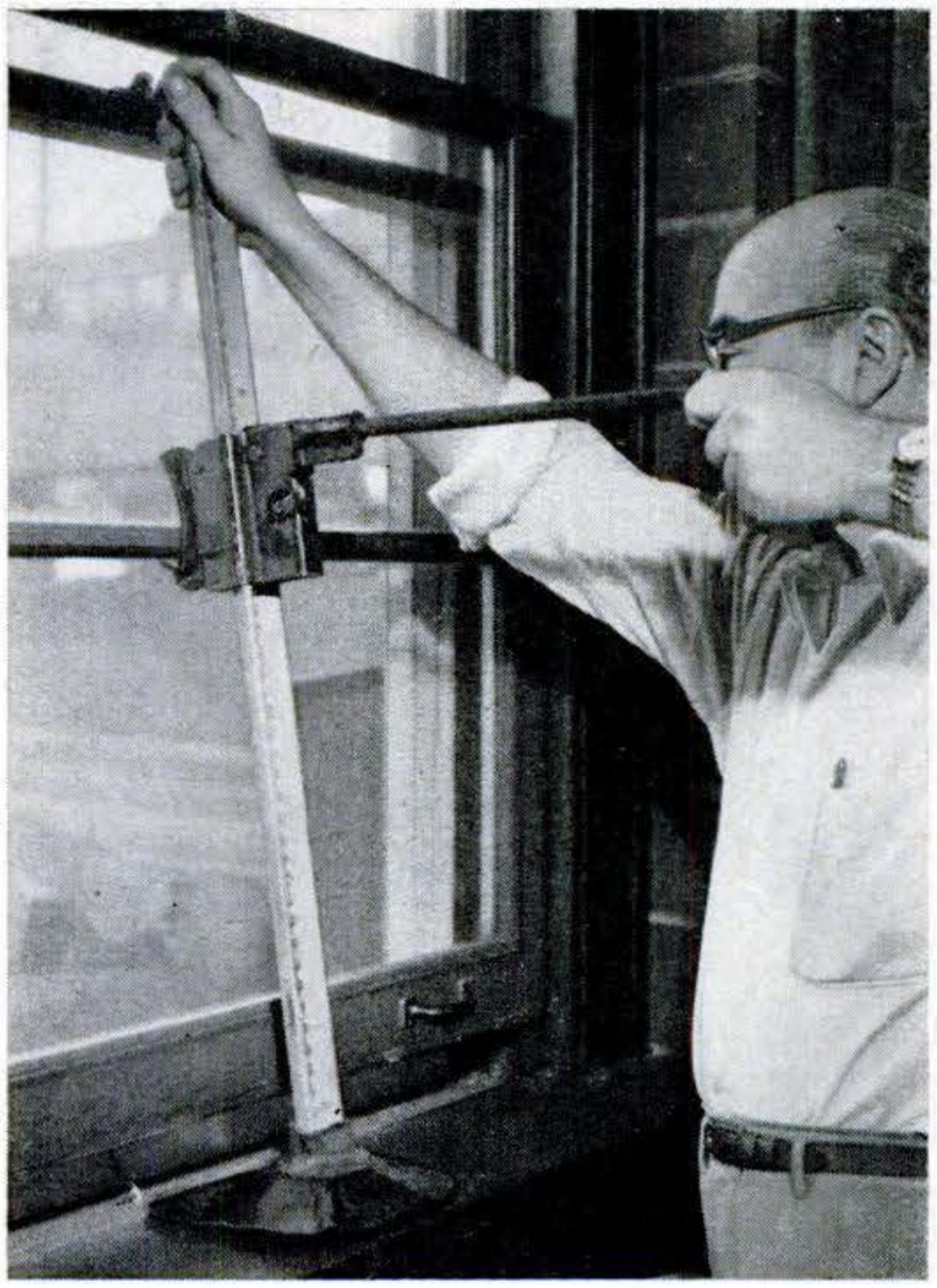
Dowel Takes Setscrew Thread

TWISTING a dowel in the setscrew hole of a doorknob cuts matching threads in it and will save you the trouble of lugging the doorknob down to the hardware store if you have to buy another setscrew.



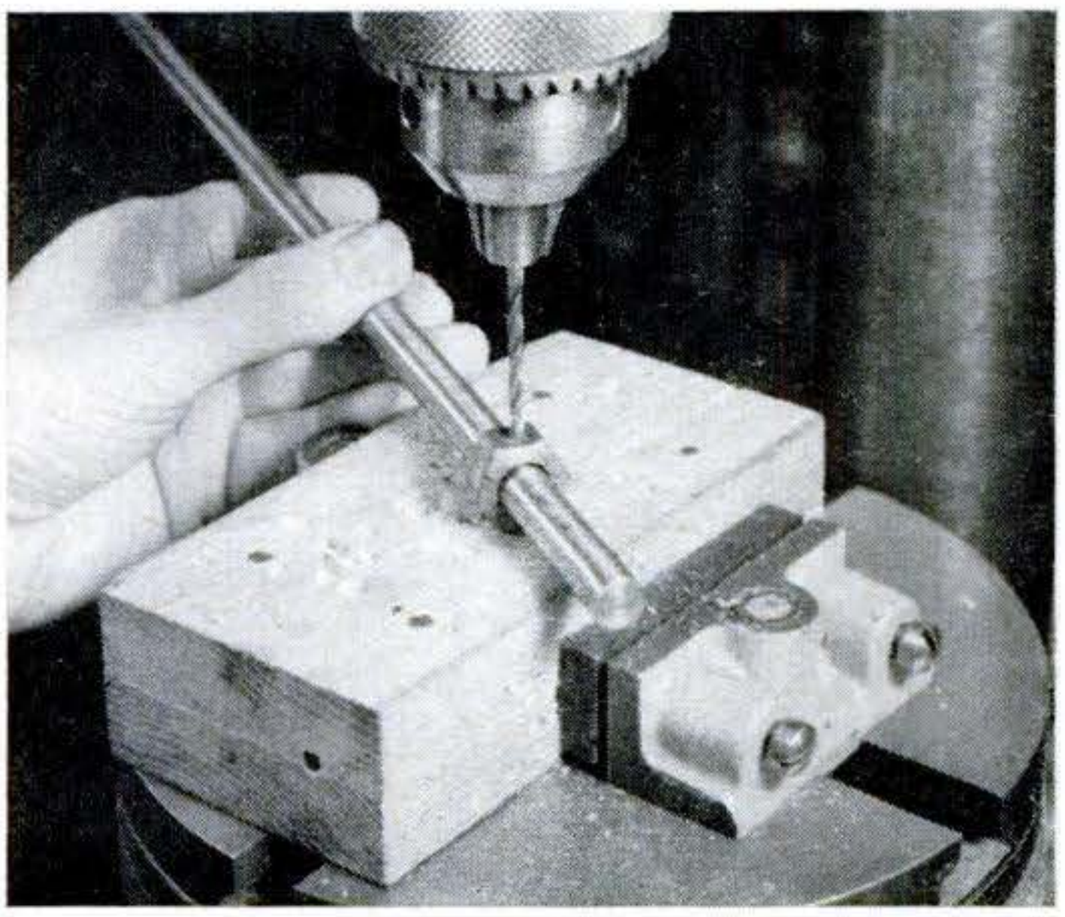
How to Prevent Splitting

TO AVOID splits when you nail near the end of a board, drive the nail at right angles to the grain, or as nearly so as possible. The above examples show how to do it right.—*W.A. Isphording, Gainesville, Fla.*



Car Jack Opens Stuck Windows

I TIRED of yanking or hammering windows in my house every time they stuck. So I now use my car jack to open them. Hold the top of the shaft to keep it from hitting the glass.—*R.L. Hay, Rochester, N.Y.*



Nut Helps Drill Round Stock

A LARGE hex nut can be converted into a drill jig for centering radial holes in rods or tubes. Ream out the nut if necessary to make it slide freely on the stock. Then drill a guide hole so that it passes through the center of the nut opening. You'll find a collection of these drilled nuts, in various sizes, handy to keep around the shop.

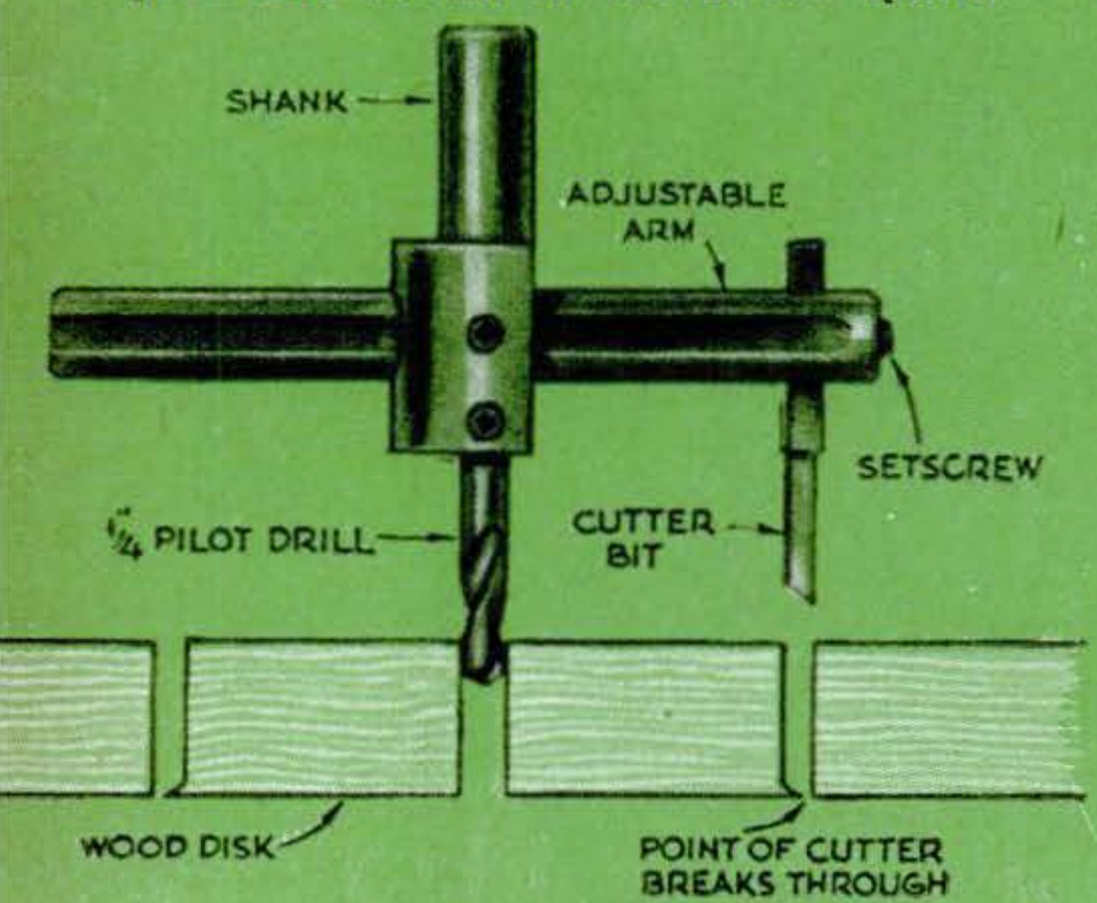
Copyrighted material

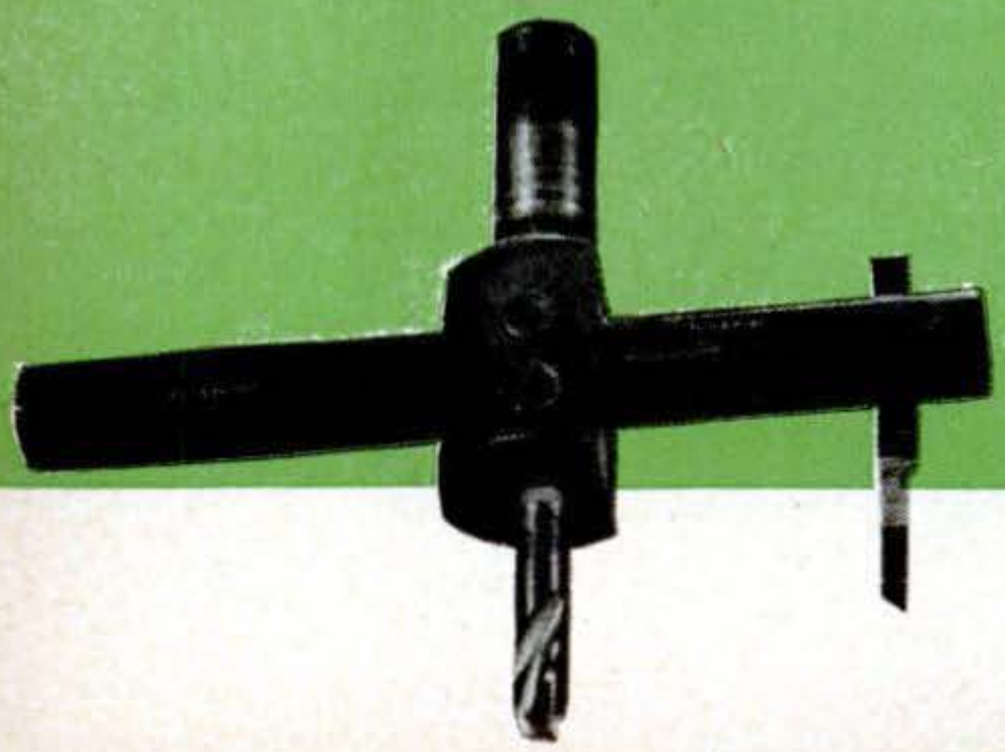
Have you been missing something good? There's a long list of

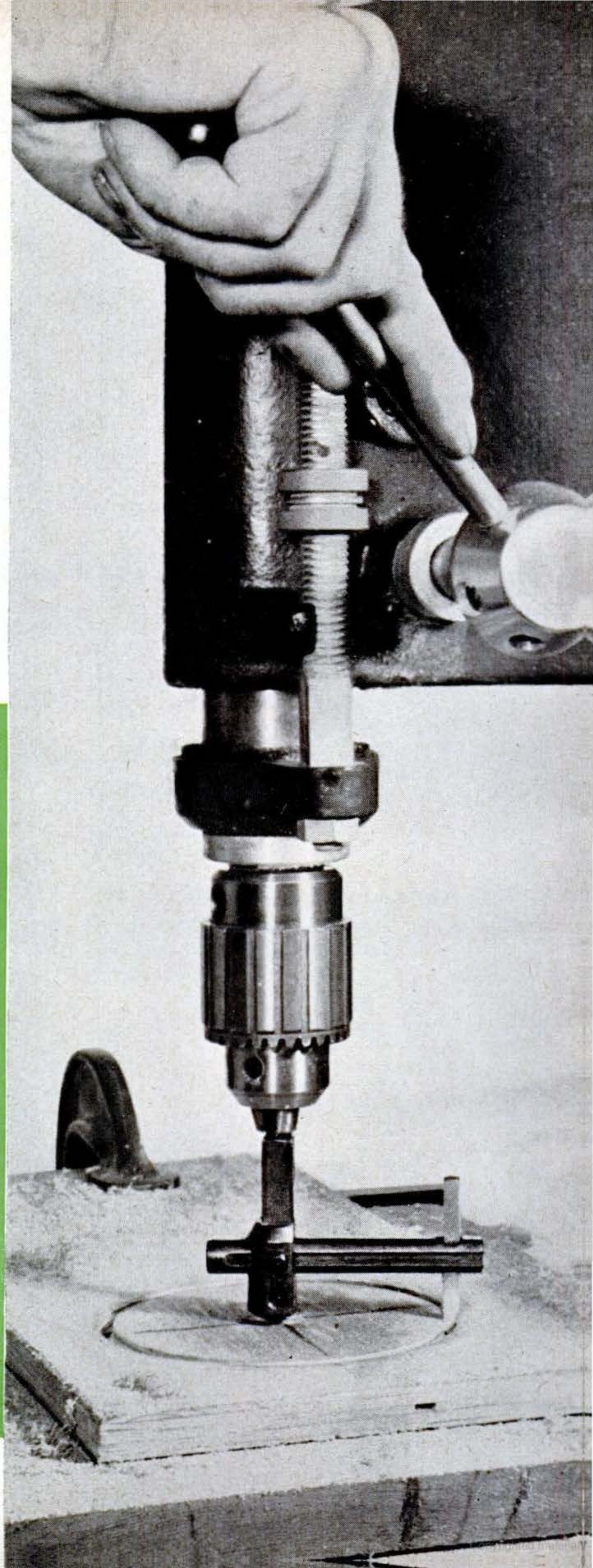
Special Boring Bits You Should Know About

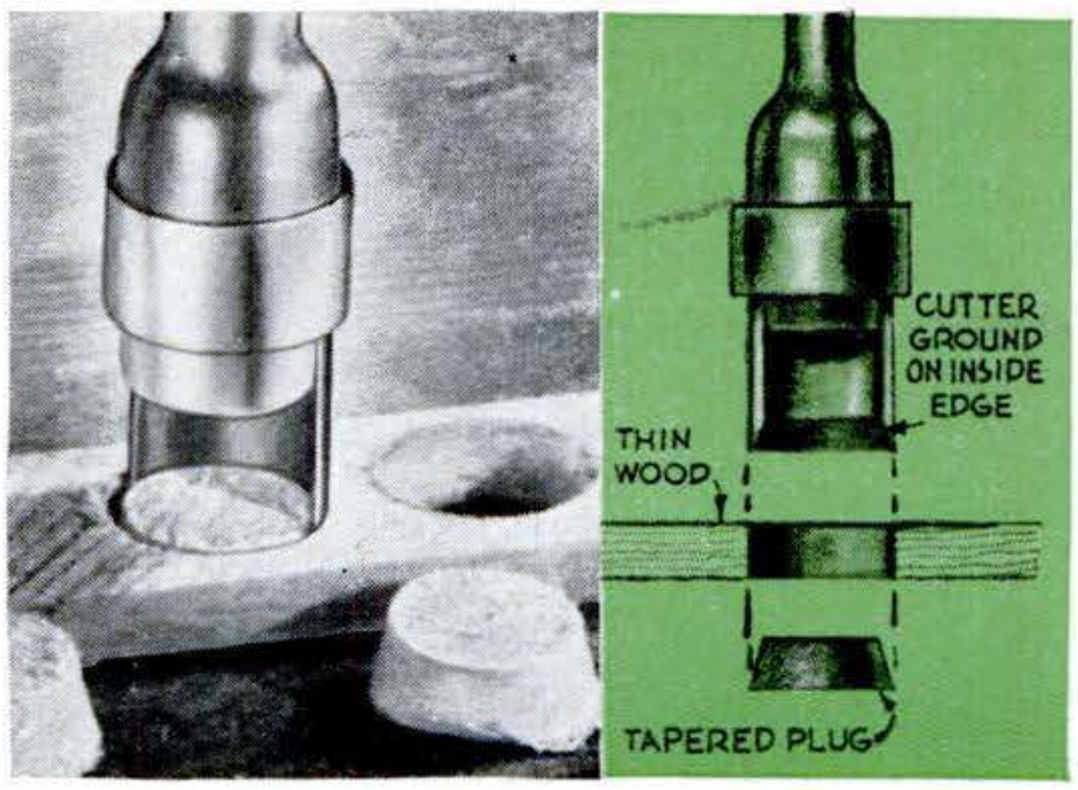
By Edwin M. Love

CIRCLE CUTTER. Want to make a really big hole? Need wood wheels for a toy that you are making? This tool produces holes or disks as big as 8" in diameter in wood up to about 1½" thick. Circle cutters come in several sizes. They work best in a drill press and should be run at low speed.









PLUG CUTTER. Out of thin wood, it cuts tapered plugs to cover deep-set screws. If the grain is very carefully matched, these plugs are almost invisible even under a natural finish.

SCREW-HOLE BIT. A real time saver, this one does three jobs at once: bores a pilot hole for screw threads, reams out the part the shank will occupy and counterbores for the screw head. The button stops the bit at just the right depth to sink the screw head flush. Bits come in sizes to match the screws you commonly use.

SUPPOSE you had a gross of screws to sink. How could you do the job the quickest way?

Any way you go about it, making holes for, and driving in, 144 screws would be a mighty tiresome job—even in softwood.

And in hardwood you certainly couldn't get by with just any old-hole, expecting a screw to make its own way. For hardwood, the approved procedure includes drilling a primary hole the same size as the screw shank, a smaller deeper one into which the threads can twist, and countersinking for the screw head.

One tool does it. All three operations can now be done simultaneously with a single tool—a screw-hole bit chucked in

CAN YOU IDENTIFY these 11 hole-making tools from Edwin M. Love's shop? Several have been altered for special work. Turn the page upside down for the names of ones you don't know.

1. expansion bit; 2. twist drill (an old one ground to point for improved wood boring); 3. spur bit; 4. screw-hole bit; 5 and 6. auger bits adapted for machine use; 7. flat bit for machine use; 8. flat bit for hand use; 9. circle cutter (you must drill a pilot hole for this old-timer); 10. small countersink for hand use; 11. rose countersink for machine drilling.

Copyrighted material

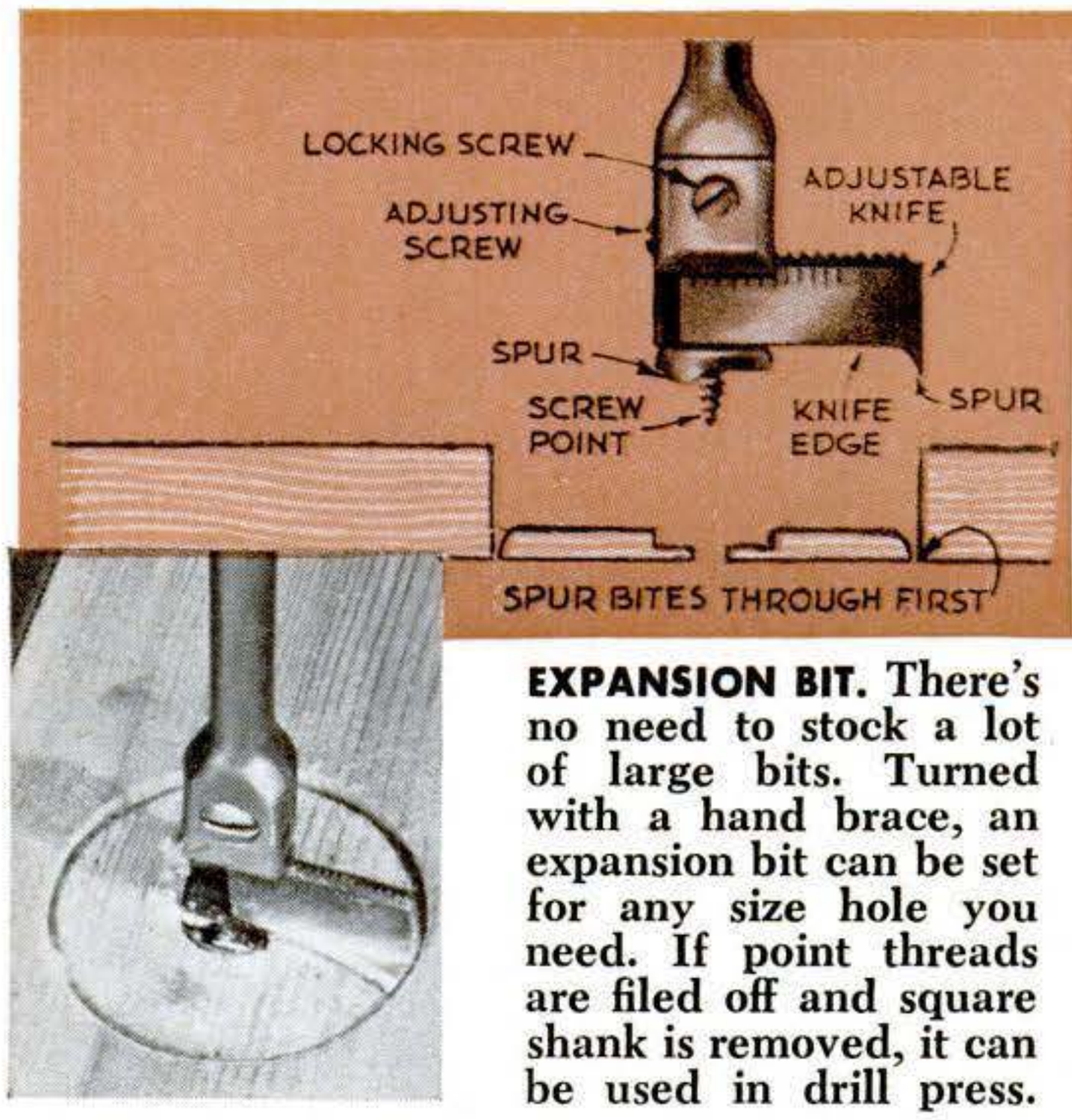
the hand drill, electric drill or drill press. Sink it to the stop and you're ready to drive the screw.

That's only one of several special hole tools the home mechanic should know about. Here's a round-up of others.

An expansion bit can do the work of several auger bits, and make between-size holes for which you cannot buy bits. It has a single adjustable knife and a screw pilot. Always clamp the knife securely before boring. The markings give approximate hole sizes, but for critical work, make some trial cuts in scrap to set the bit.

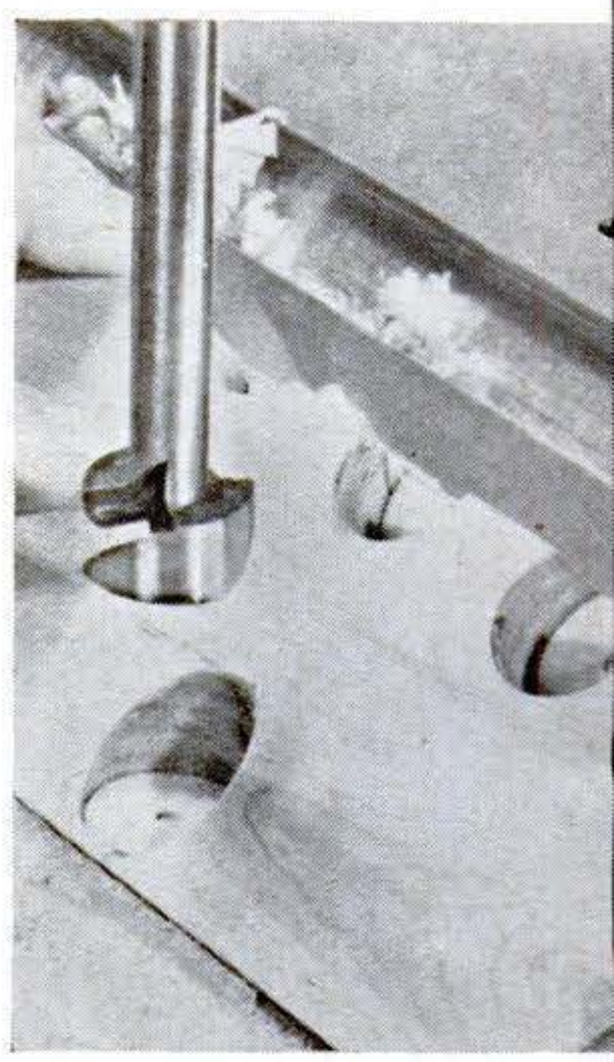
A circle cutter has the bit mounted on the end of an adjustable arm. To minimize break-through splintering with this or an expansion bit, either clamp a backing block behind the work or, better, bore only until the pilot breaks through, and then turn the work over, insert the pilot and finish the boring from the other side.

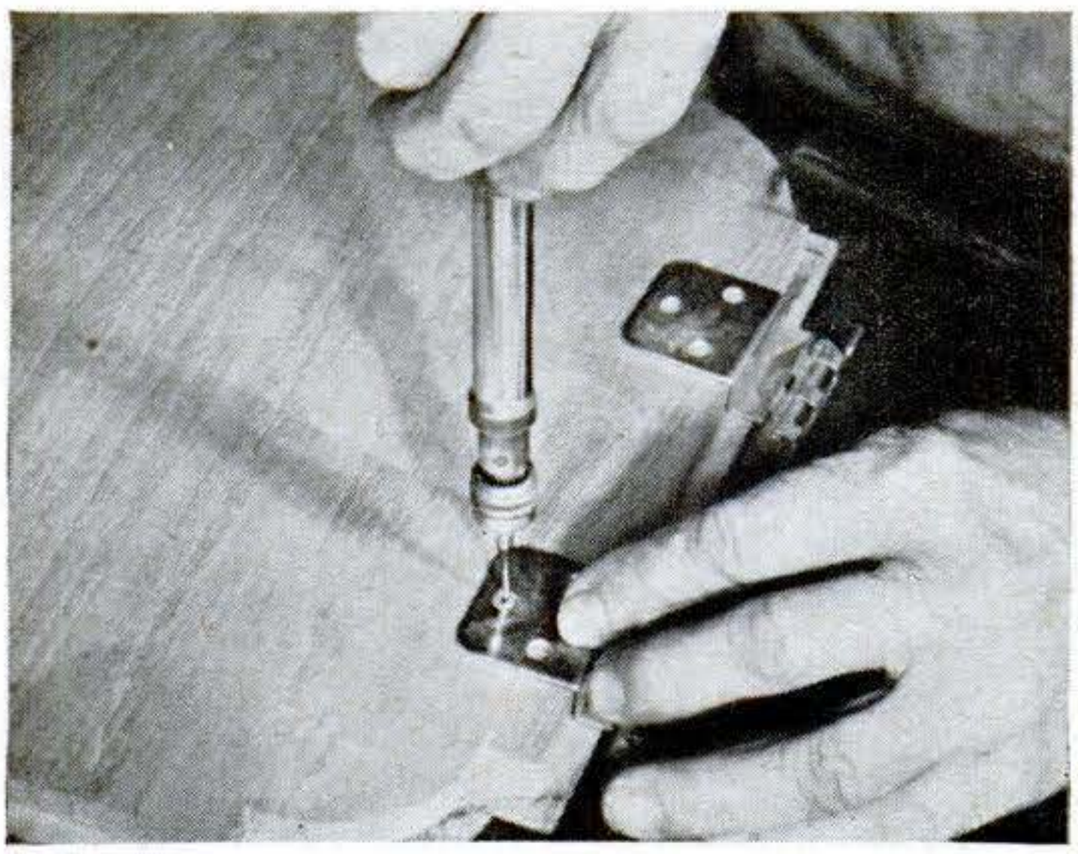
With any tool that cuts on one side only, run the drill press at low speed and clamp the work securely. When using such bits in an electric drill, keep a quick trigger finger on the switch. Never hold the work by hand.



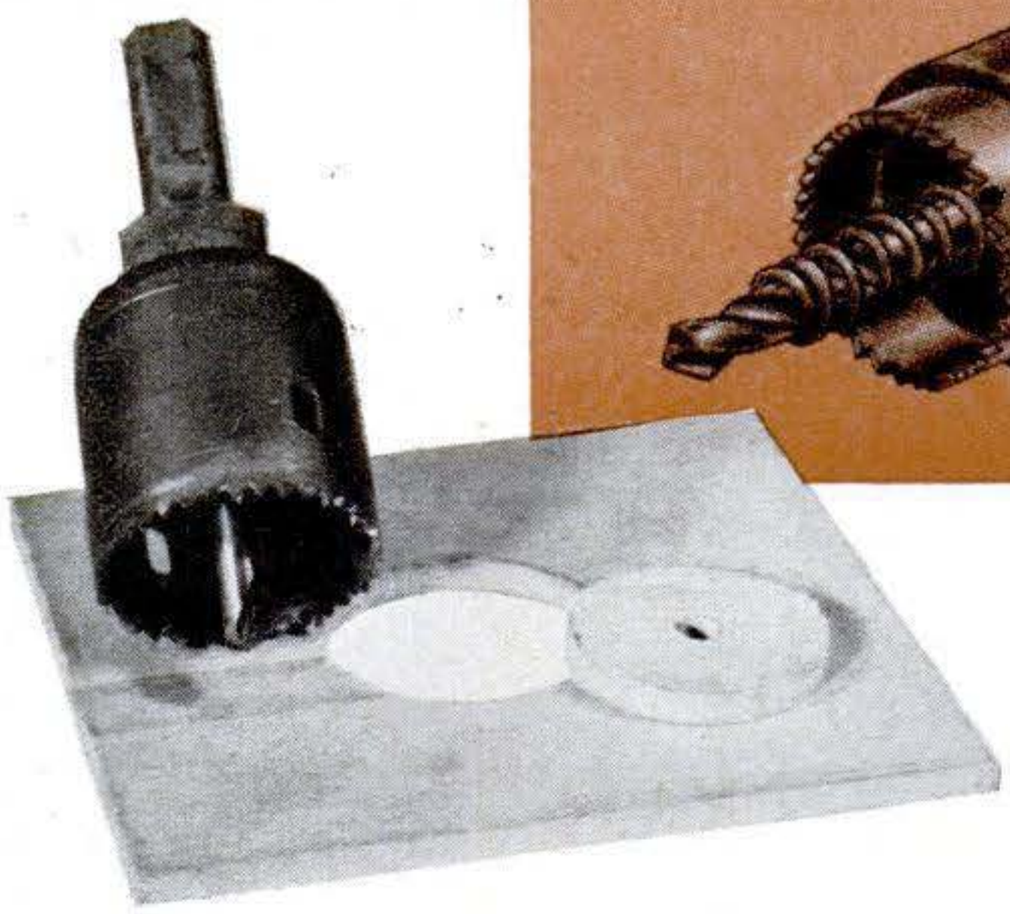
EXPANSION BIT. There's no need to stock a lot of large bits. Turned with a hand brace, an expansion bit can be set for any size hole you need. If point threads are filed off and square shank is removed, it can be used in drill press.

FOERSTNER BIT. Two cutting lips and a circular knife edge shear smoothly through wood fibers. Since the bit has no center point, it produces flat bottoms in holes that are not bored right through the work. Clamp wood in a drill press and you can cut any part of a circle from its edge. These bits are also made with square shanks for chucking in hand braces.



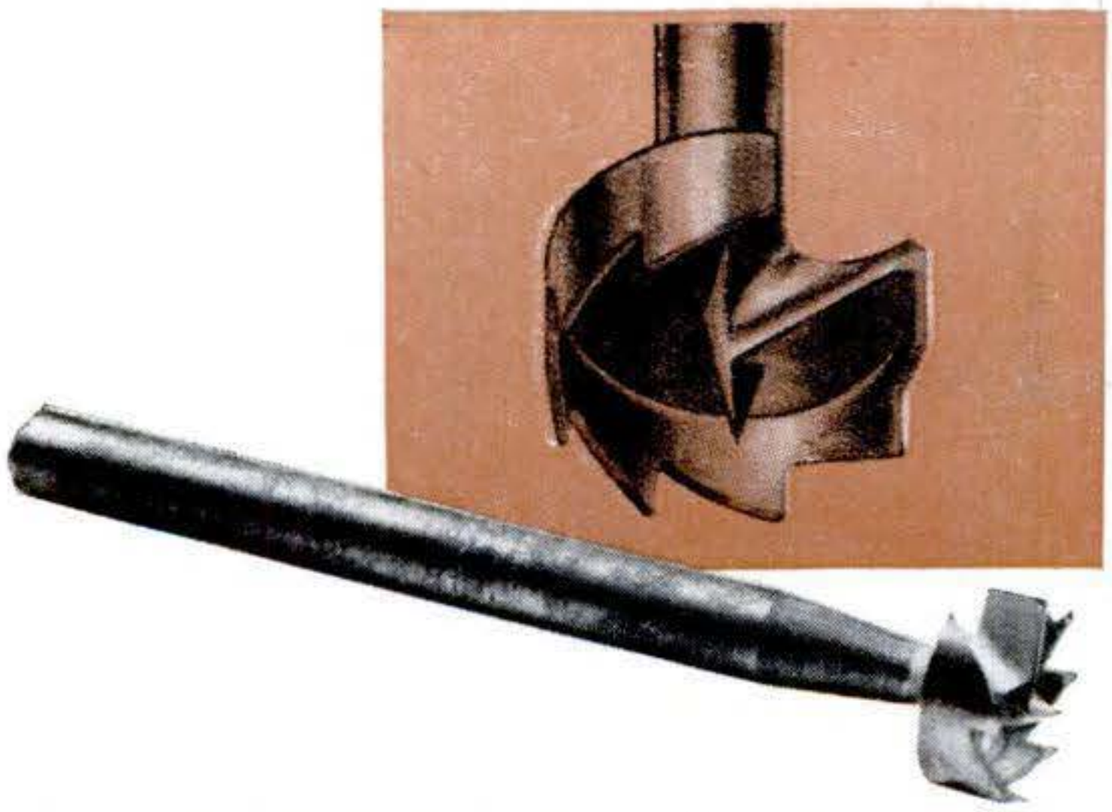


PUSH DRILL. This is a handy tool when you have only one hand free to bore a hole. Here screw holes are quickly drilled while a hinge is held in place as a guide. Several straight-flute bits come with such a drill.

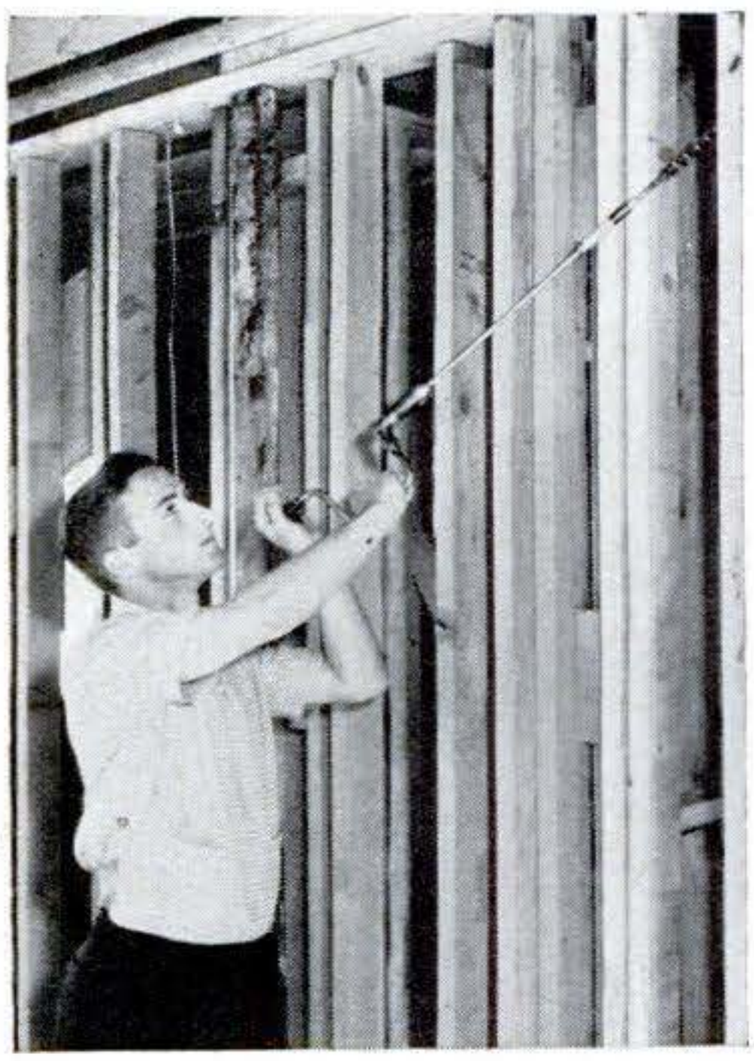


HOLE SAW. A circular saw blade cuts a neat round hole in wood or metal, and a compression spring knocks out the plug. A hole saw is a perfect tool for cutting thin plywood.

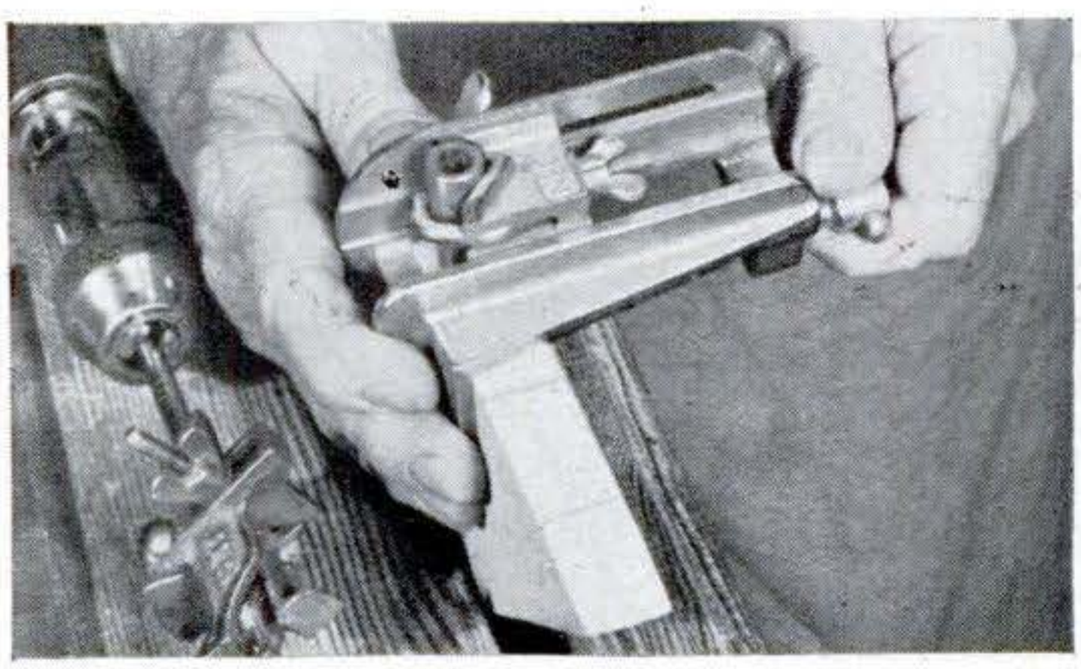
Copyrighted material



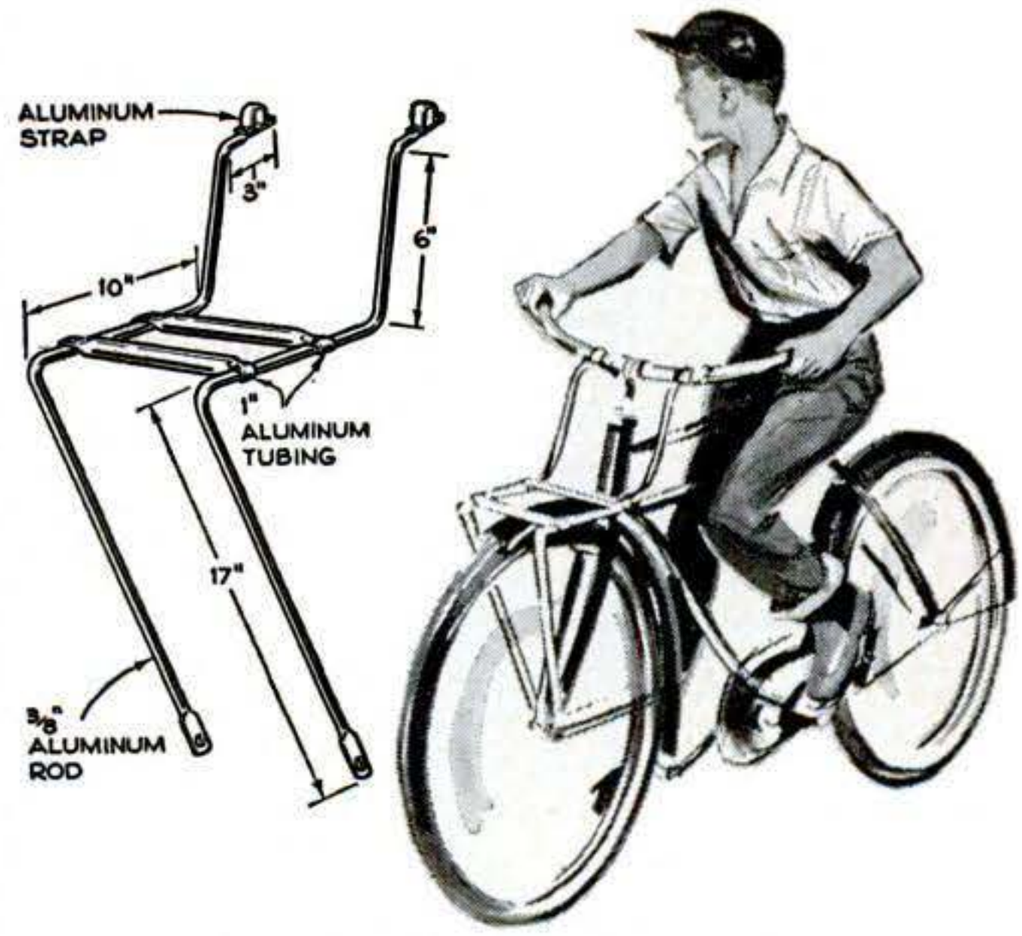
MULTIPLE-SPUR BIT. With its many cutting edges, this works fast and will make scads of truly round holes before it needs resharpening. Sizes range from ½" up to 2".



EXTENSION. Install an extension between a hand brace and auger bit like this and you're all set to bore into deep recesses or to make overhead holes without standing on a ladder. The extension will follow the bit into an 11/16" hole. This makes a fine combination for boring wiring holes in lamp columns of wood.

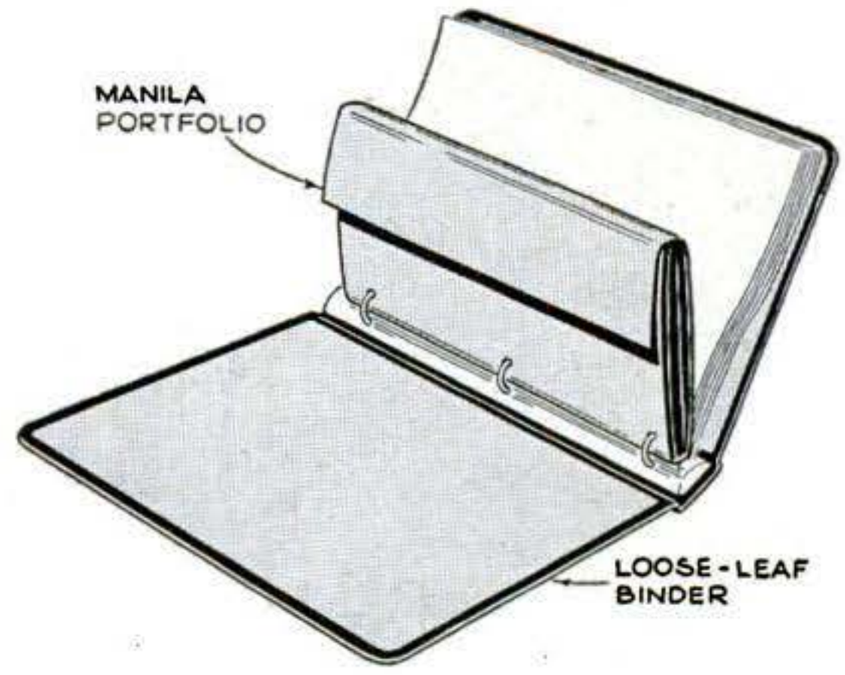


DOWELING JIG. This puts edge holes exactly where you want them. Clamp it on the board with its centerline over the penciled guide line. Then center and lock a bushing of the required size in position. Once set, it will locate a dowel hole in a second board so that both holes are aligned. A bit gauge, seen at the lower left, is clamped to a bit to stop it when the hole has reached the desired depth. END



Bike Rack Made in an Evening

THIS sturdy bike rack is just the thing for Junior to carry schoolbooks or packages on. Bend two 36" lengths of ⅜" aluminum rod to the shape shown above and fit them to the bicycle by trial. The cross-pieces are 9" lengths of 1" aluminum tubing with the ends flattened and secured with self-tapping screws. Fasten the frame to the handle bars with aluminum straps over protective strips of rubber.—*Charles Lomas, Kensington, Md.*



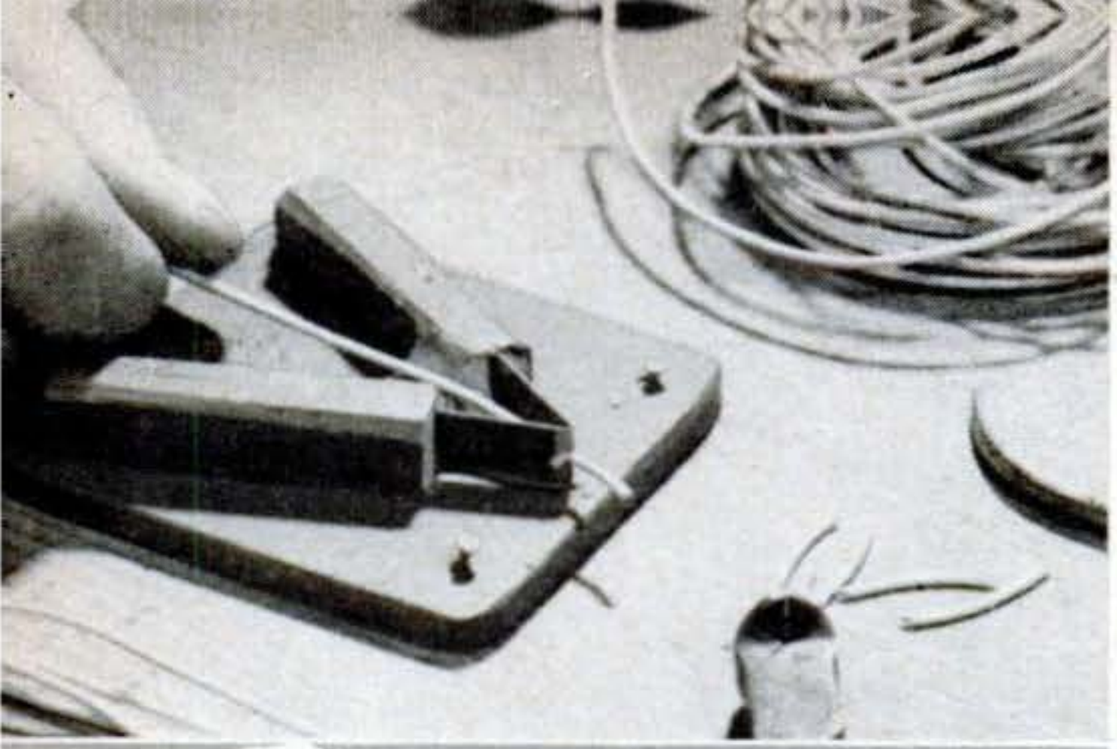
Folder Makes School Kit

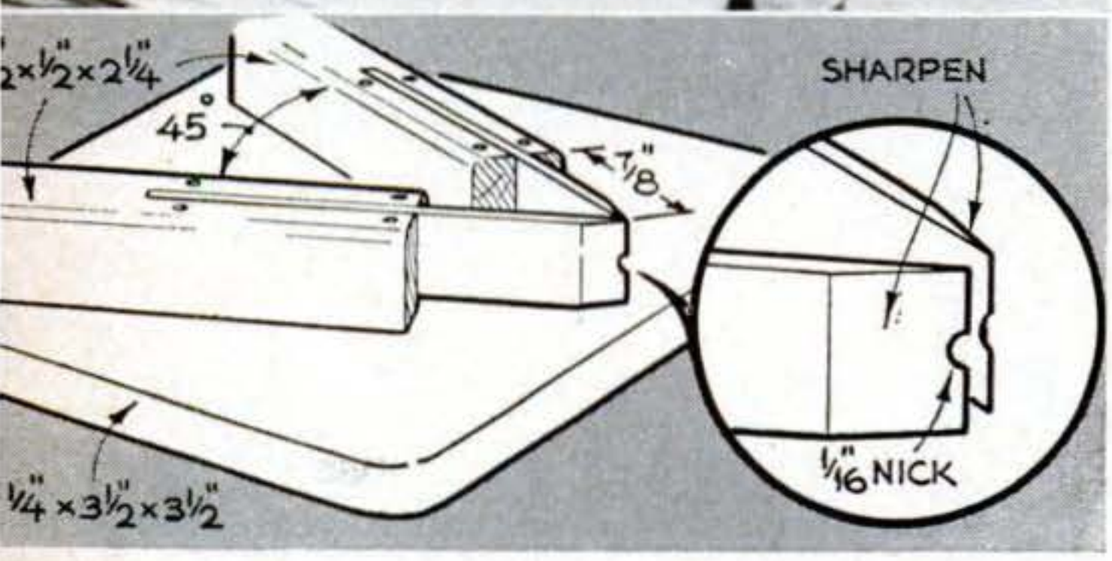
A HANDY pencil kit for a school child can be made by mounting a small Manila portfolio in a loose-leaf book. Punch holes for the rings and reinforce with gummed circles.—*Frank Shore, NYC.*

Pencil Lead Lubricates Lock

LOOSEN up a sluggish lock by pouring powdered lead from a soft pencil into the working parts when graphite isn't handy. Powder the lead by rubbing it on sandpaper or a file and collect it on a sheet of paper.—*R. W. De Cesare, Vallejo, Calif.*

Copyrighted material





Two Wire Strippers That Give You the Pro Touch

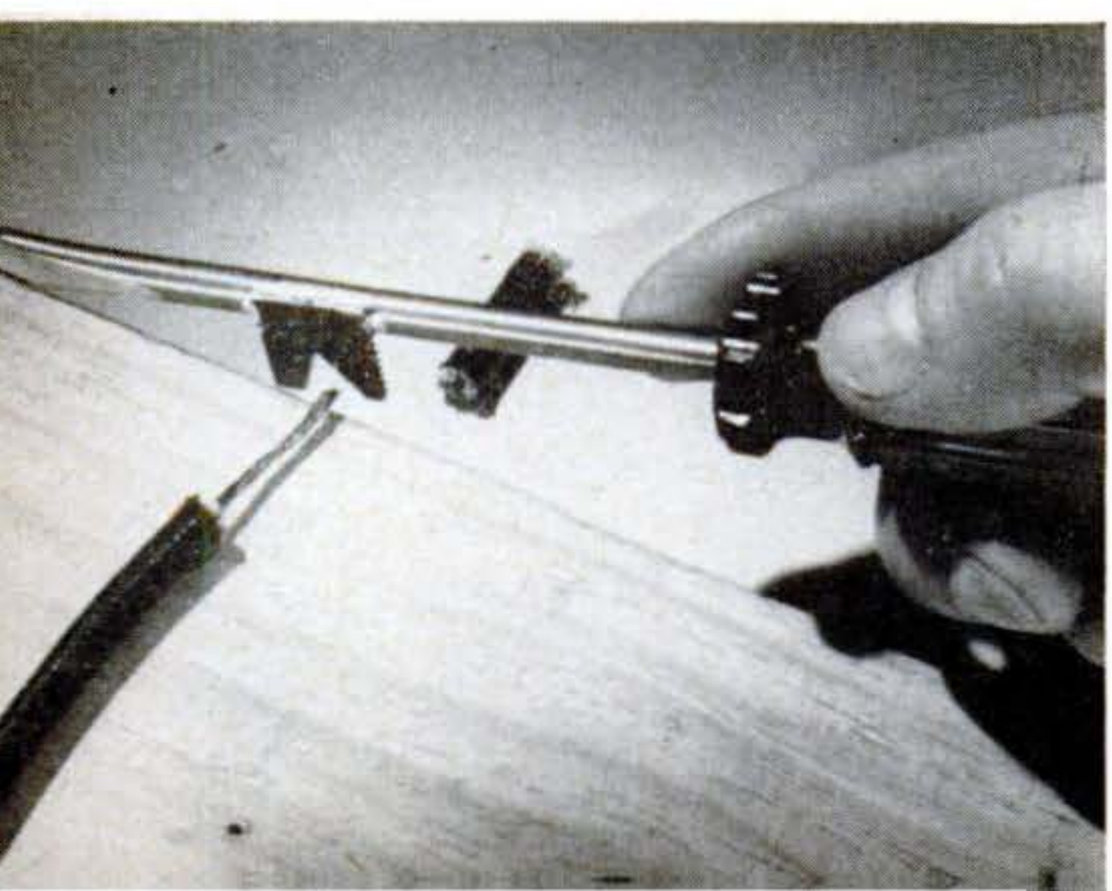
If you aren't adept at stripping electrical wires with a knife, you may find it helpful to have one or both of these homemade strippers on hand.

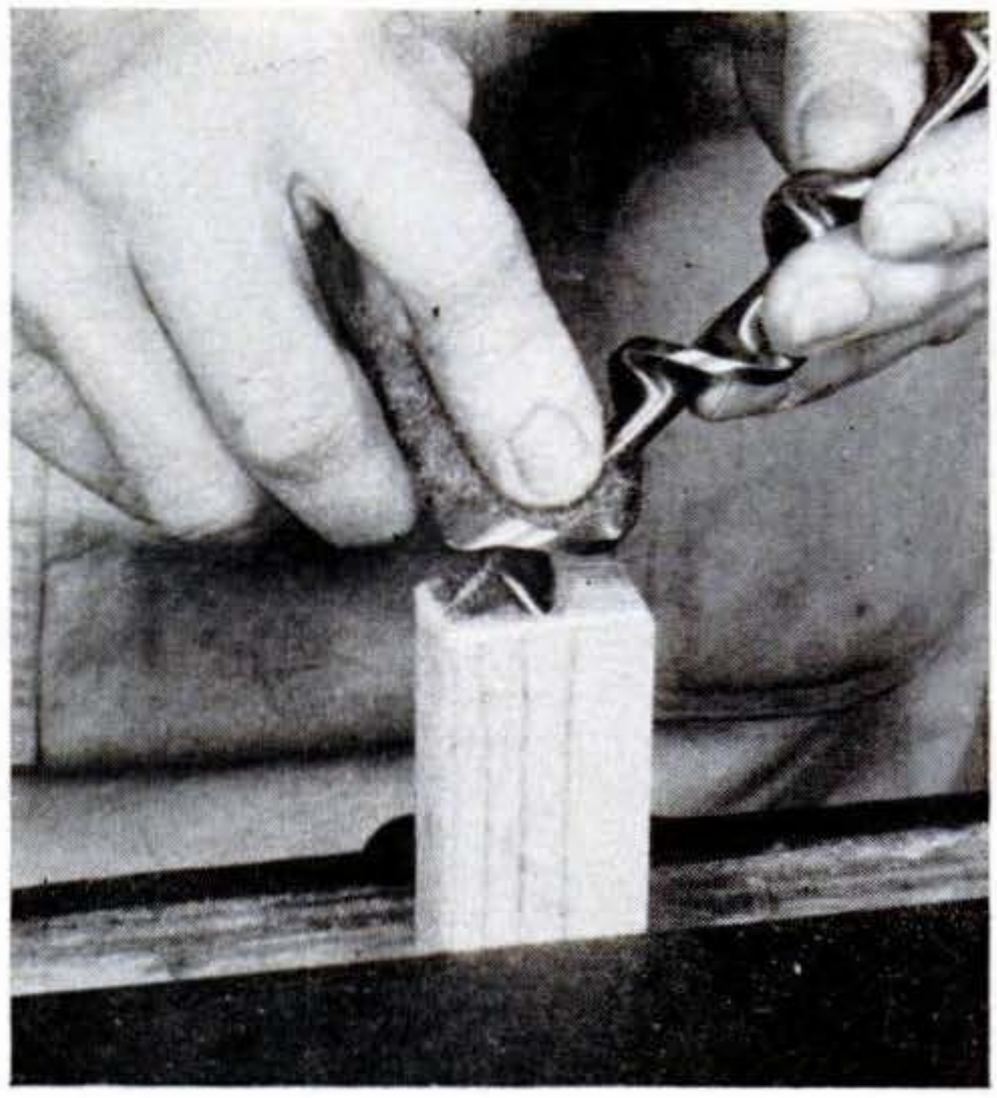
The triangular job above cuts and strips the insulation as you pull the wire back, after inserting it between the knives by a forward motion. The forward motion also seats and locks the wire in the mating nicks in the stripping blades.

To make it, grind about ⅞" of teeth from each of two 2½" lengths of hacksaw blade. Sharpen the ends of the blades, as shown, and press the blades into saw kerfs made in the diagonal members.

The screwdriver attachment below cuts through the insulation as you rotate the wire in the knife slot. When you tug the wire the insulation stays behind.

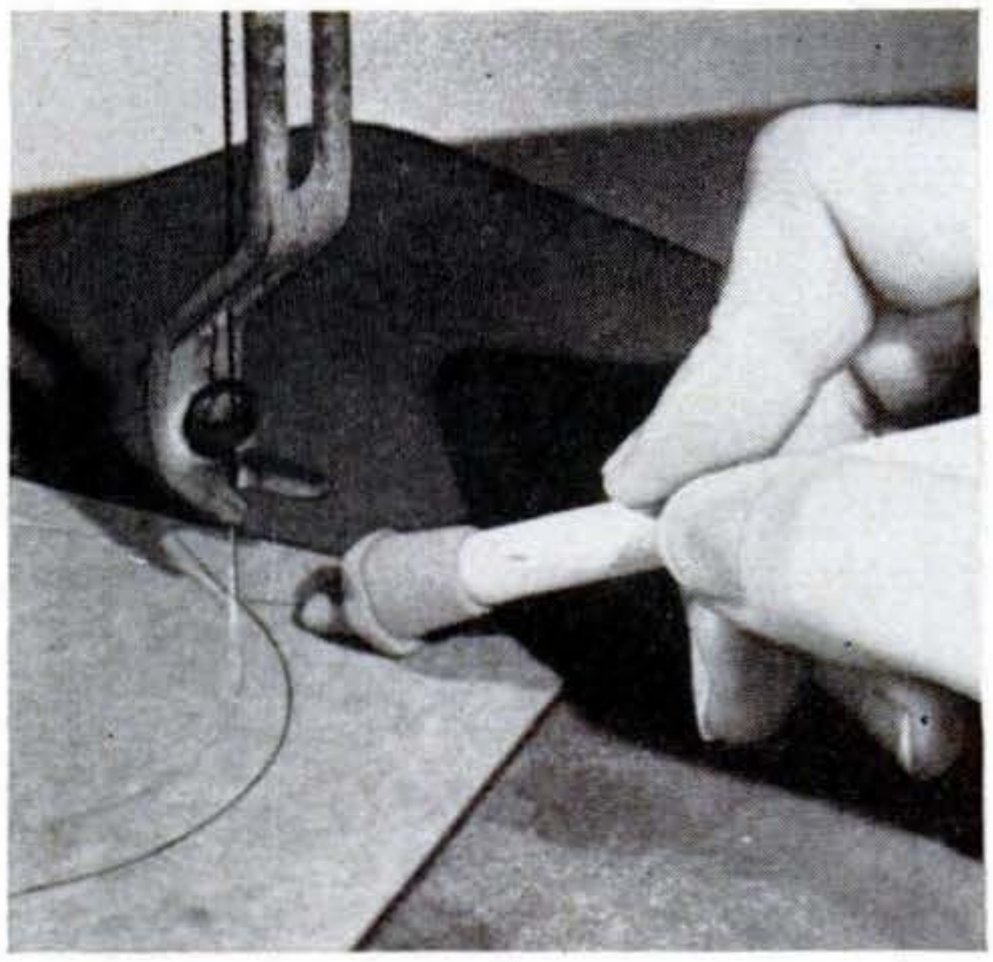
This stripper is a piece of spring steel with a triangular notch filed in one edge. The edges of the notch were then ground to knife sharpness on the side adjoining the screwdriver shank to which it is welded.





Polished Bits Turn Easier

Auger bits discharge shavings better and heat less if you keep them polished. Rub a wad of steel wool along the flutes occasionally. It's also a good idea to wipe the bit with an oily cloth after each use.—*Edwin M. Love, Palmdale, Calif.*



Stick Guides Jigsaw Work

You can guide work into a jigsaw blade with a push stick made by slipping a pencil eraser on a piece of ¼" dowel. This will keep your fingers away from the blade.

Chalk Clogproofs File Teeth

To file brass, aluminum or other soft metals with an ordinary file, rub chalk liberally into the teeth. The chalk will keep the metal from clogging up the teeth.—*Lew Williams, Columbus, Ohio.*

Copyrighted material

Extension Reel Puts Light on Job

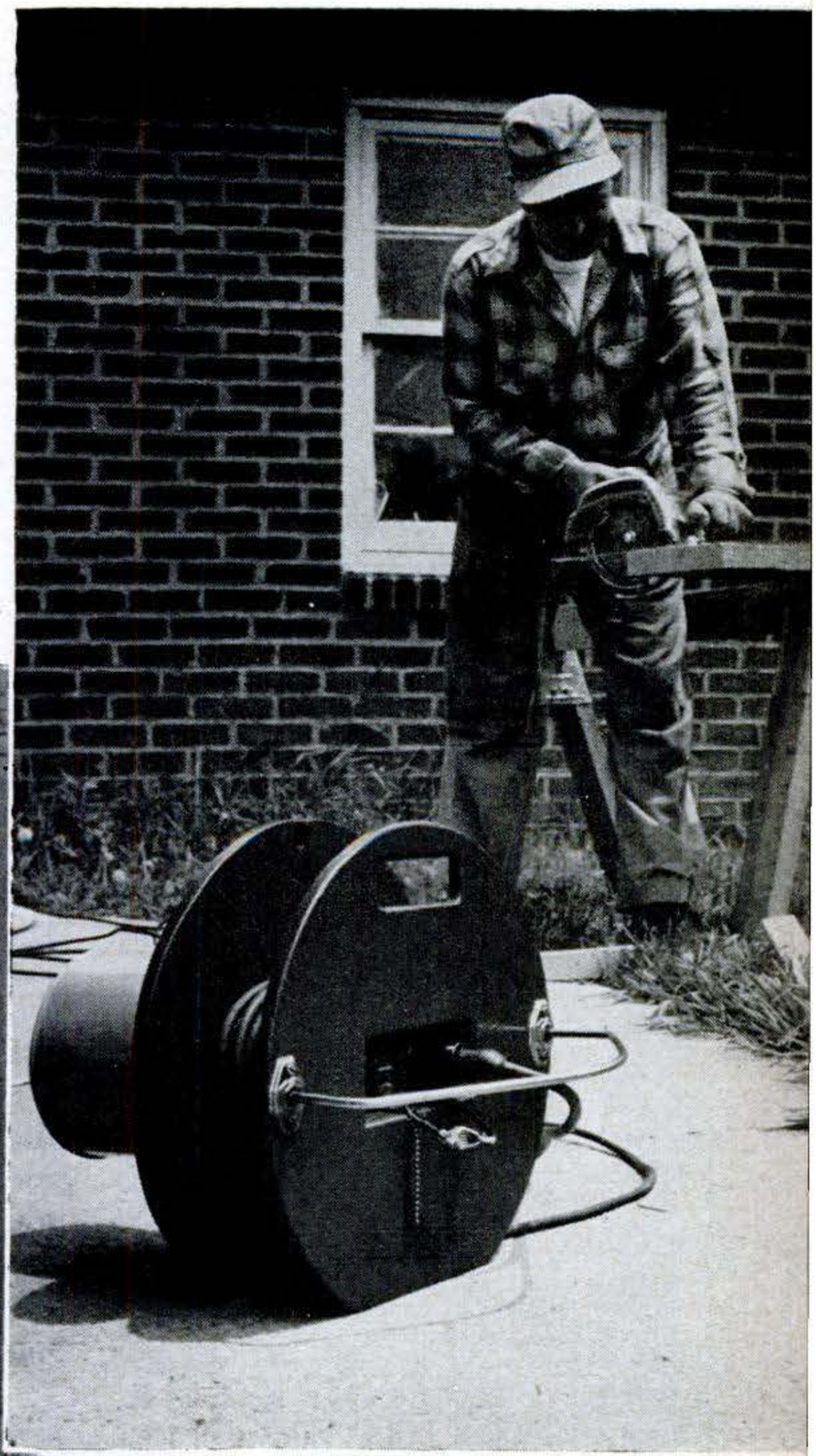
By R. G. Cooper

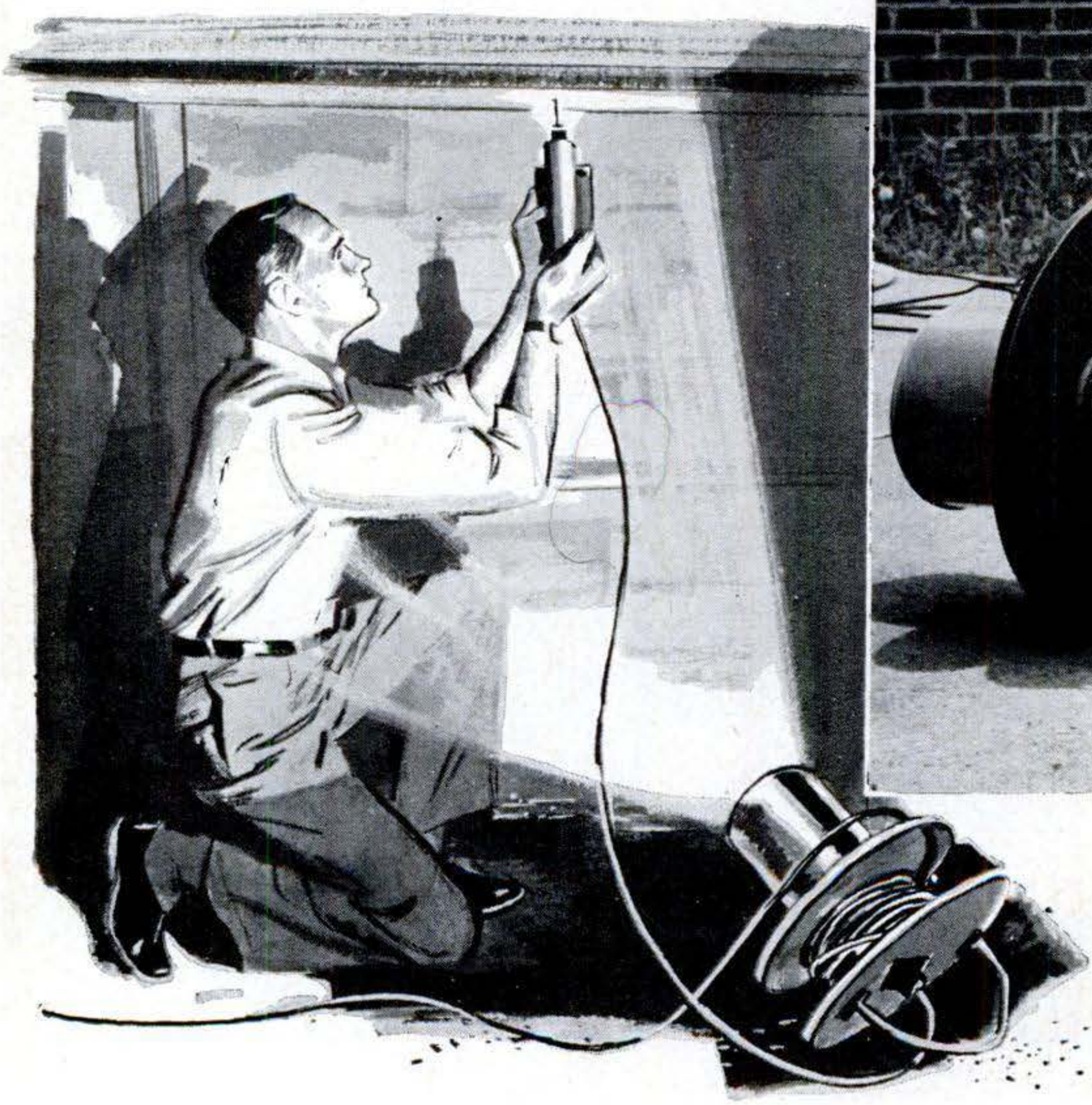
AFTER unrolling enough extension cord from this multi-purpose reel to bring power to the job site, you can plug in one or several portable power tools and connect their ground wires to a ground terminal for safe operation. Then as dusk approaches, or if you work into a dark corner, you can turn on a built-in light and aim it where you need it.

To ground the tools, the extension should be No. 16 three-wire line cord, and the plug should have a pigtail for attaching to the primary outlet box.

Make the reel hub first; its shape is determined by the receptacle and light socket used. Those shown are identical in size. The tool-lead receptacle is a two-outlet, 15-amp. Bakelite type, 5″ long by 1¾″ wide. The lamp socket is a surface type with a pull chain. Fasten them back to back on a ½″-plywood divider. Then build the four sides of the hub around them, grooving one side to clear the pull chain. Round all corners so that they won't dig into the wire.

Cut two 13½″ disks of ½″ plywood for reel ends, brad them together lightly and

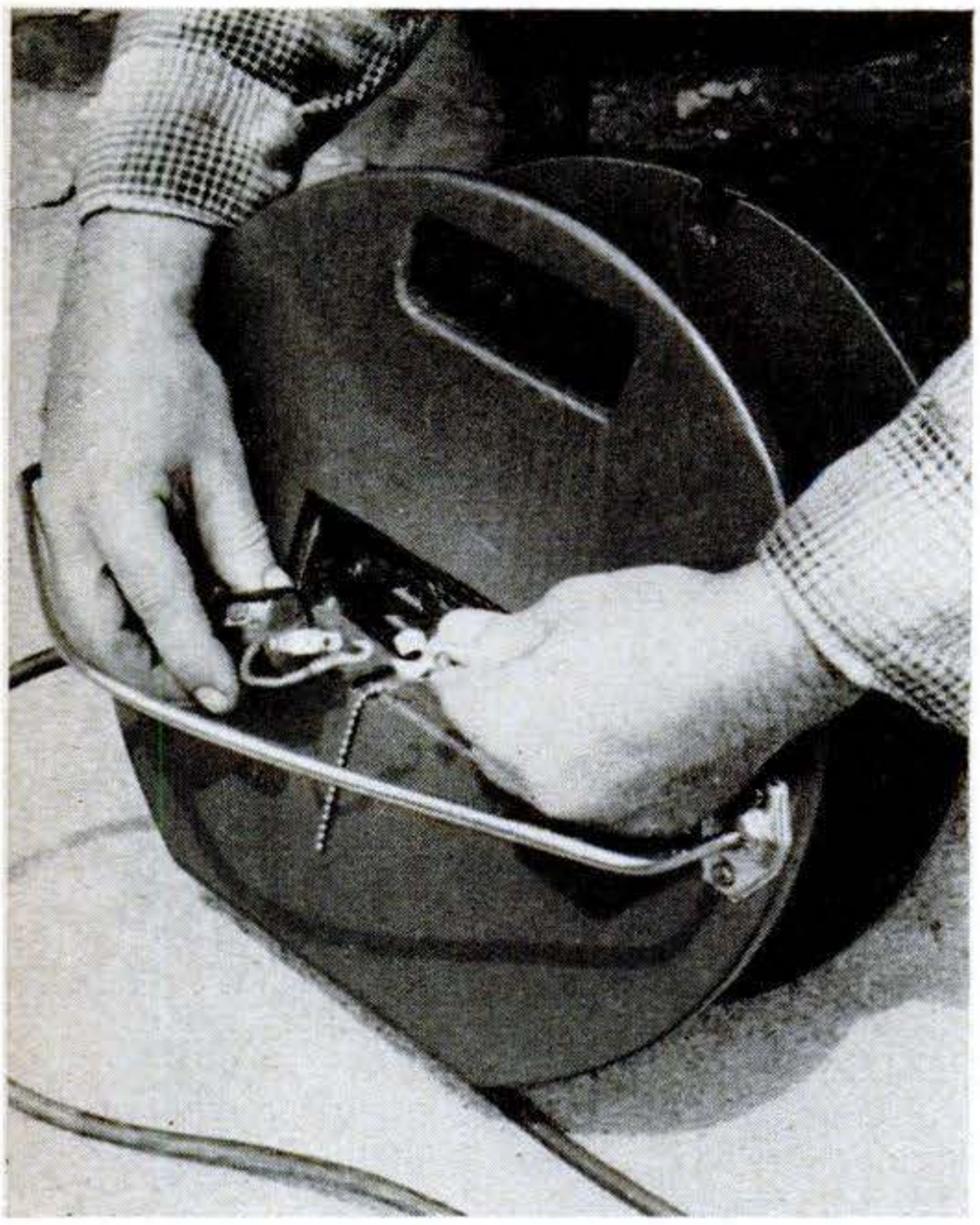




NIGHT AND DAY, this extension-cord reel is an often-needed job accessory. By night or in dark corners (left) it throws light where you want it; by day (above) it carries power to outside work.

Copyrighted material

cut a 6½″ flat edge on both at the same time. In one disk cut a handle and a rectangular opening to match the receptacle. Add a dime-store towel bar, bent as shown. It will serve as an angle support on the ground or as a hanger for overhead lighting. Cut a hole in the center of the other disk to fit the socket.



TO GROUND a tool for safe use, clip an alligator clamp to the tool's ground lead. The clamp is soldered to the third wire of the cord.

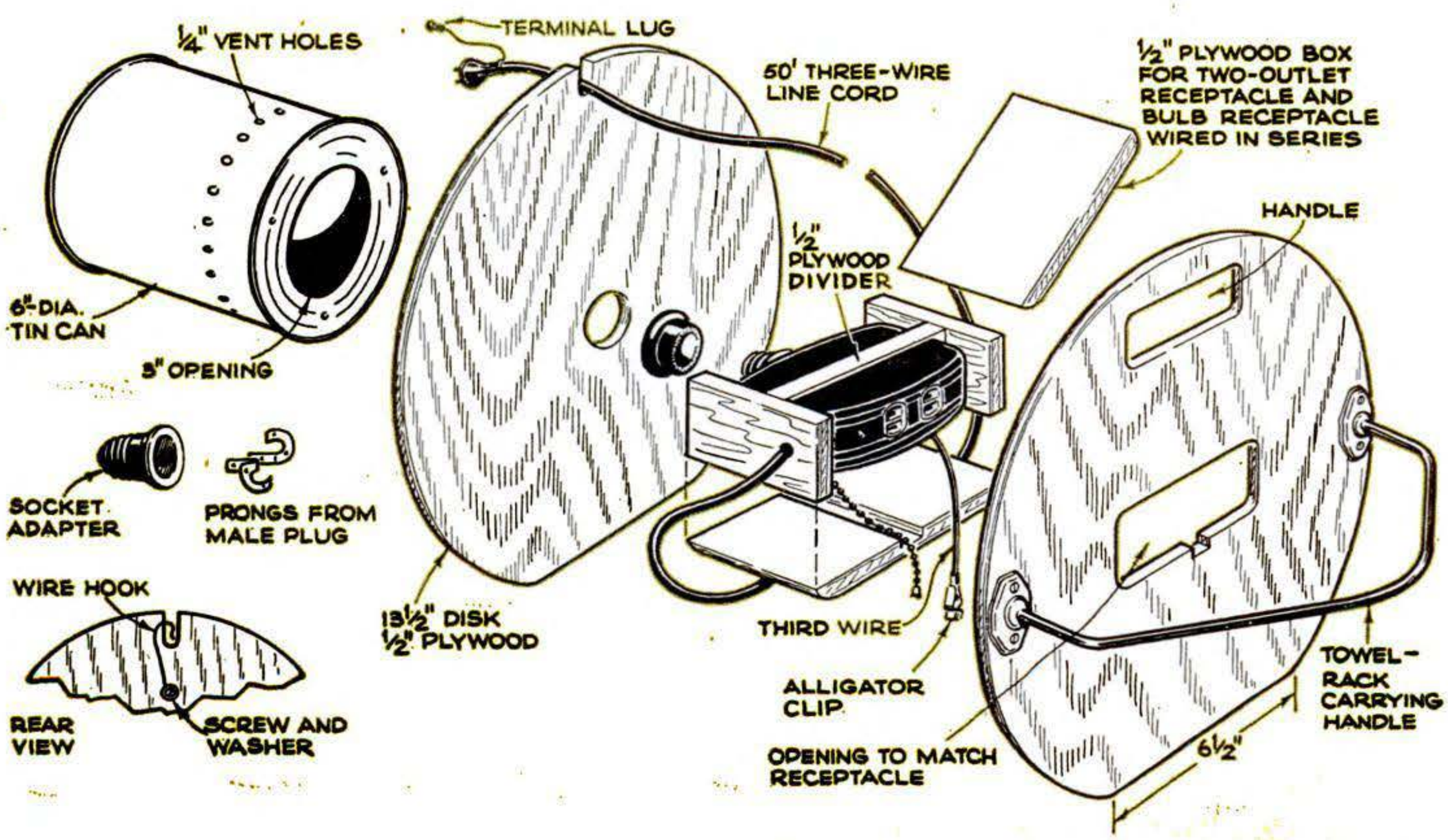
Fasten the first disk to the hub with 1″ wood screws. Screw the shade-holder ring on the socket to secure the other; then line up the two flats and screw the second disk to the hub. Cut a reflector from a 6″-diameter tin can, leaving a flange on the bottom so that it can be screwed on over the socket.

Connect two wires of the three-wire cord to the receptacle in the reel. Bring the third wire out and attach an alligator clip to its end. At the plug end of the cord, hook up two of the wires to a two-prong plug and pull the third wire (usually the green one) out through its neck. Solder a terminal lug to its end. When using power tools, snap the alligator clip on the tool's ground lead and fasten the terminal lug to the metal case of the outlet you plug into, using one of the screws that hold the cover plate on.

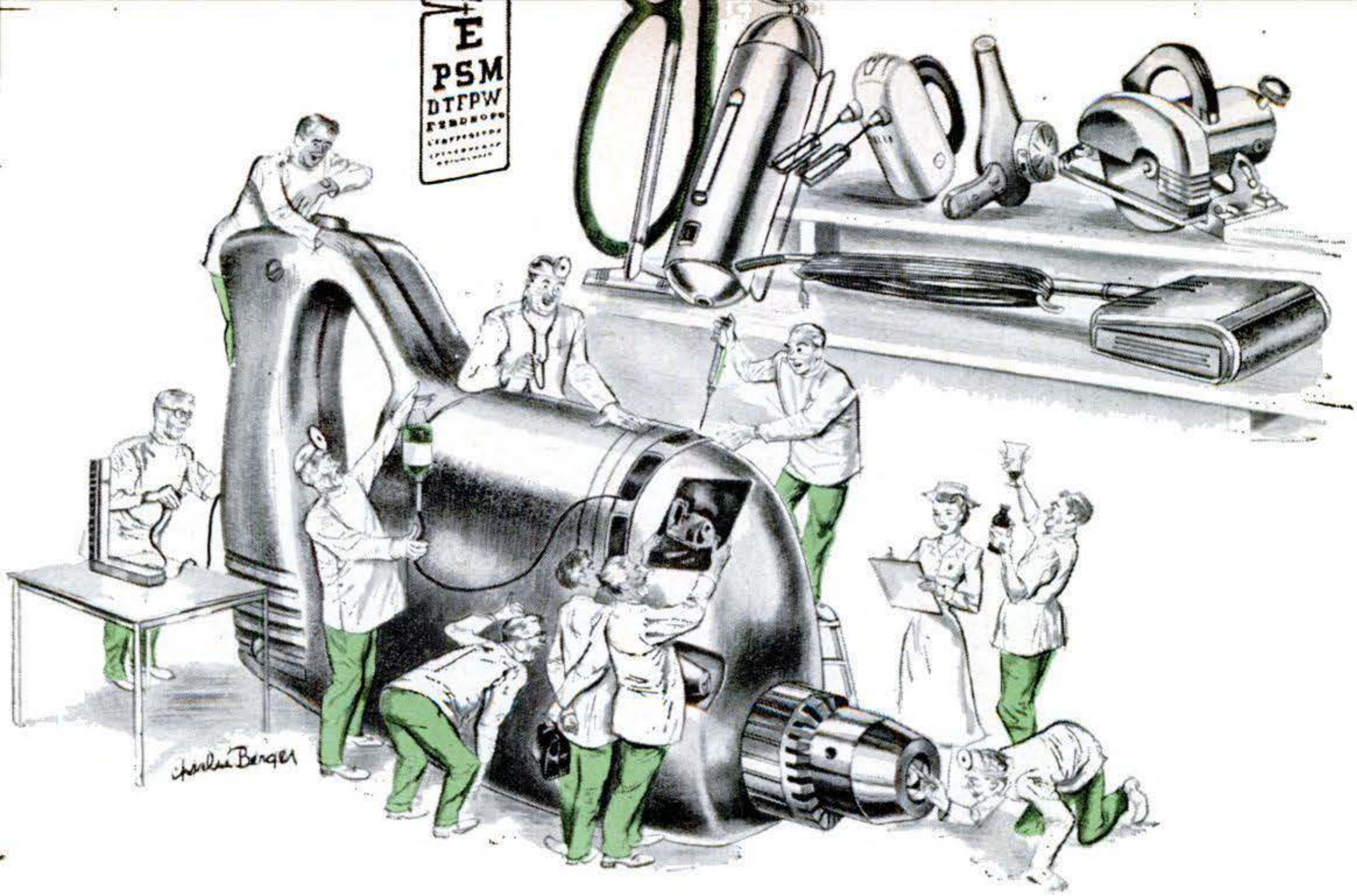
Screw two prongs from an old plug to the reel for storing a socket adapter; you'll need it if you have to plug into a garage or porch light.

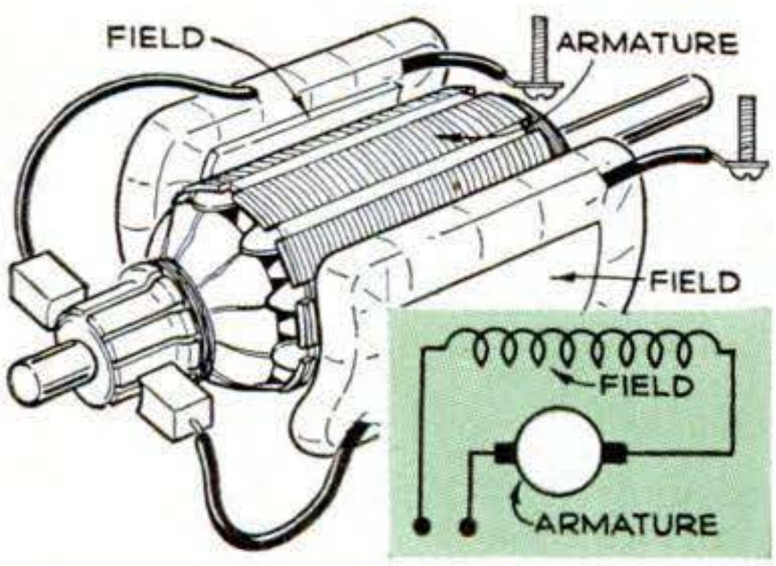
Bend a hook from coat-hanger wire and fasten it near the cord slot to anchor the plug when the cord is reeled in.

Wind 50 to 100 feet of cord on the reel and you've got power all over the lot.

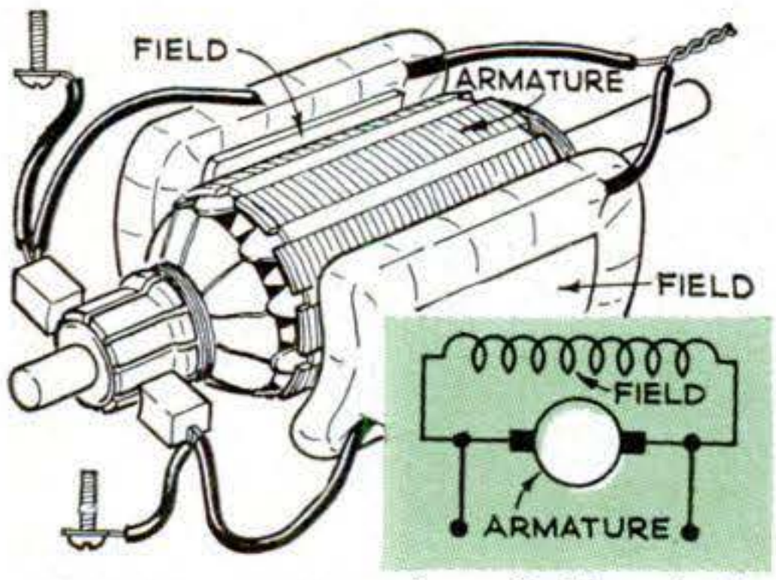


Copyrighted material





CALLED UNIVERSAL because they run on AC or DC, these motors are of two types. Most common is the series motor above. Its field and armature are in series, often with the brushes between the two field coils. It develops a high starting torque.



SHUNT MOTOR has field windings and brushes connected in parallel. It runs at a constant speed either free or loaded, but does not have a high starting torque. If a series motor is reconnected in shunt, it must be operated at lower voltage.

First Aid for Universal Motors

How to service those little power plants that drive many home and shop appliances.

By J. W. Rocke Jr.

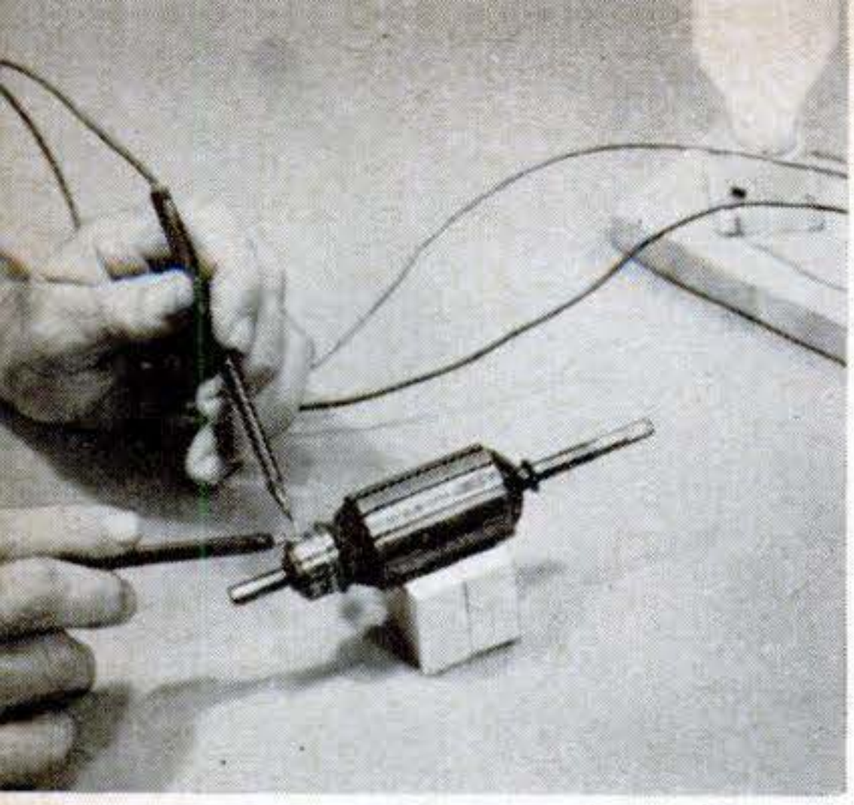
I LEARNED about universal motors by mistake—one that I had made overhauling the dust collector on my bench sander. It caught up with me one night when Cam Evans was at work in my shop.

Cam was sanding some shelf brackets. Suddenly a shriek drowned out the whir of the sanding belt. The motor of the dust collector revved up to a whine before he could snap it off.

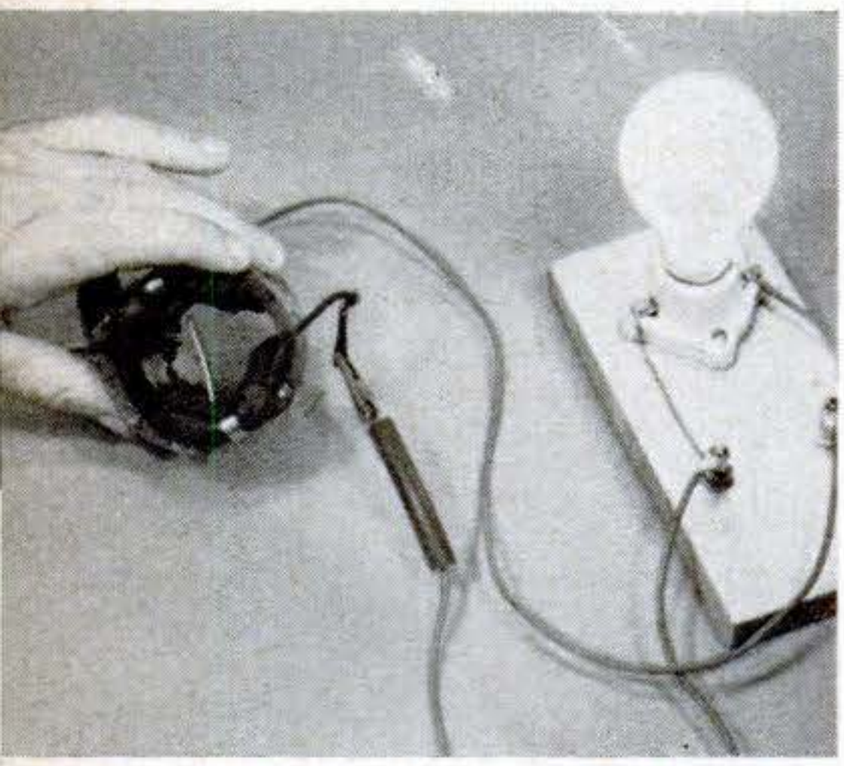
"Just yank the plug and finish sanding without it," I suggested. "That thing hasn't worked right since I put in new brushes."

Cam, the manager of our local power plant, is a neighbor of mine. He comes to my place when he has any woodworking to do, for his own shop is rigged

Copyrighted material

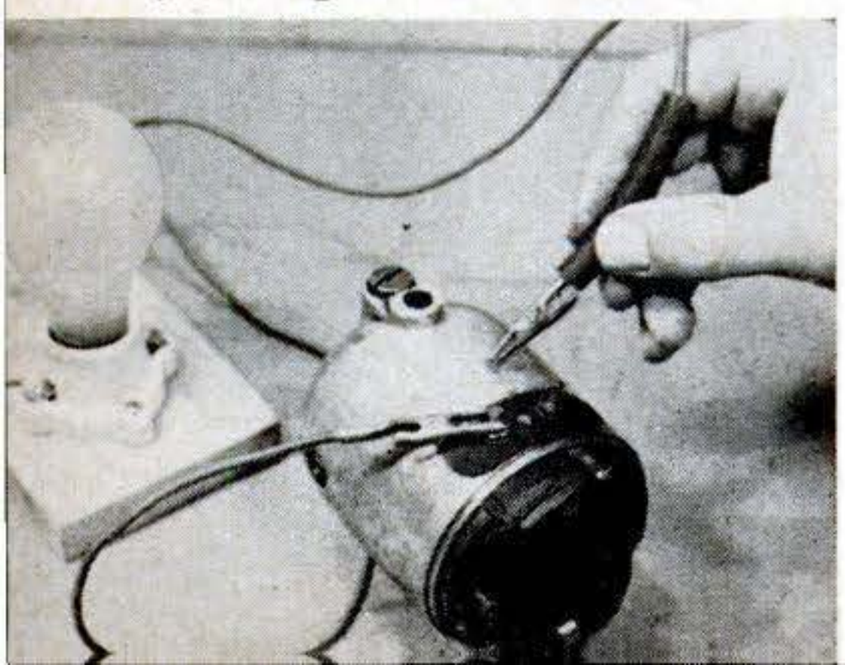


SERIES TEST LAMP is a 40-watt bulb. Hook one socket terminal to line, the second to one test prod or clip. Run other side of line to second prod. Hold one prod on a commutator bar and touch each of the other bars with the second prod. If lamp fails to glow, there is an open circuit in the winding connected to that bar. If lamp glows when second prod is held on the shaft, winding is grounded.



NAIL TEST shows whether field polarity is correct. Join two ends of field coils and touch test prods to the other leads. If a nail refuses to stand inside field core, the poles are alike and motor will not run. Interchange leads of one coil. Nail stands upright as shown when the polarity is correct.

CHECK FOR GROUNDS with one prod on terminal (or both if motor has a switch) and other on the case. Lamp should not glow. An internal ground may not keep motor from running, but is a shock hazard. An extra wire from case to an outside ground protects the user.



strictly for a busman's hobby—in his case, electricity.

"Tomorrow's Saturday," he said as he was leaving. "Bring that motor around and we'll fix it."

The backward drill. When I entered his basement shop next day I found Cam and Bud Nolan bending over a hot workbench. Hot electrically, I mean. Cam's main bench is loaded with meters, switches and pilot lights.

Bud is a bright teen-ager who's headed for an engineering degree. He's often at Cam's place.

"It sparks like anything," he was saying, and snapped on an electric drill lying on the bench. Even from where I stood, I could see fireworks inside.

"The commutator's smooth," he added, shutting it off. "What should I do? I know—new brushes!"

Cam shook his head, and Bud looked puzzled again.

"One thing I'd do—" I began, and stopped.

"Hello, Jack," Cam said to me. "What were you saying?"

"Oh—only that Bud better reverse the motor. You couldn't drill with the chuck running backward."

Bud went pink. "Brush leads were frayed, so I put on new ones—and hooked 'em up wrong! Thanks. Wish you could tell me how to stop that sparking, too."

"He has," said Cam. "You know what happens when a motor runs backward for its brush setting."

"That's it! It'll spark. And brushes always wear a bit lopsided, so they stub their toes when the motor runs the other way, and spark even more."

Elated, Bud took the drill to another bench.

Runaway motor. I laid down the dust collector I'd brought. When Cam unbuttoned the motor, the suction fan fell out. It took no Edison to guess what had made that shriek—the blades showed scratches where they'd scraped the housing. From the fan hub Cam removed a mangled setscrew. He grinned as he saw it.

"Wrong-size screwdriver," I mumbled. "Chewed up the slot so I couldn't tighten it right."

"Uh-huh. I'll check the motor now."

Sliding out the armature, Cam stepped around the commutator segments with two prods. A bulb blinked each time, except in two spots.

"Open circuit there," he said, pointing to a couple of loose wires with one prod.

"I didn't notice those before."

"No, they were thrown out by centrifugal force when the fan came off. A universal series motor has no speed limit—it'll run wild without a fan, gears or other load to hold it down."

Deftly he soldered the leads back in their slots. Then he ran a thumbnail over the copper bars.

"I undercut the mica with a hacksaw blade like you always do," I said hastily.

Copyrighted material

"Uh-huh. But you ground the blade too narrow. It sawed slits in the mica, leaving high sides. See how heat expansion has shoved the uncut sides up?"

Deflated, I could only nod.

"The mica should be undercut clear across between bars, as deep as its width. I'll show you."

In his lathe, Cam skimmed off just enough copper to leave the commutator smooth. After undercutting it with a broken hacksaw blade, he laid the armature on what looked like an electromagnet.

"This is a growler," he said, and sure enough it growled as he switched it on. Rotating the armature slowly, he held the hacksaw blade over its core.

"The AC magnetic field induces a potential in the armature windings," he explained. "If one is short-circuited, a current would flow and magnetize the core, attracting the blade. But it's okay."

Seating the brushes. Shutting off the growler, Cam frowned over the new brushes I'd put in. "See that shiny line on the end," he said, holding one up. "That's how much was riding the commutator."

"But don't they have to wear in?" I asked.

Cam shook his head. "It's better to seat 'em."

Cutting a strip of fine sandpaper, he taped it around the commutator and slid the armature into the housing. "Now we put the brushes in and turn the shaft," he said, and did so. As he was taking the armature out again, Bud coughed behind us.

"Drill work all right?" Cam asked him.

"Yeah. I haven't used it, but it runs real cool on the bench. I—uh—got another job."

Rather sheepishly he laid down some motor parts.

"Looks like an old hair dryer," I said.

"It's Margie Benson's," Bud confessed. "It was so gummed up that the shaft hardly turned. I even took out the field windings to clean it. Now it won't run."

"Did you make the nail test, Bud?" asked Cam.

"No, guess not. What's that?"

"A test for field polarity, good for universal motors or little shaded-pole AC motors like this one. Touch the test prods to the field-coil leads."

As Bud did so, Cam placed a small nail between the field poles. It fell over, buzzing.

"You hooked one coil up backward," said Cam.

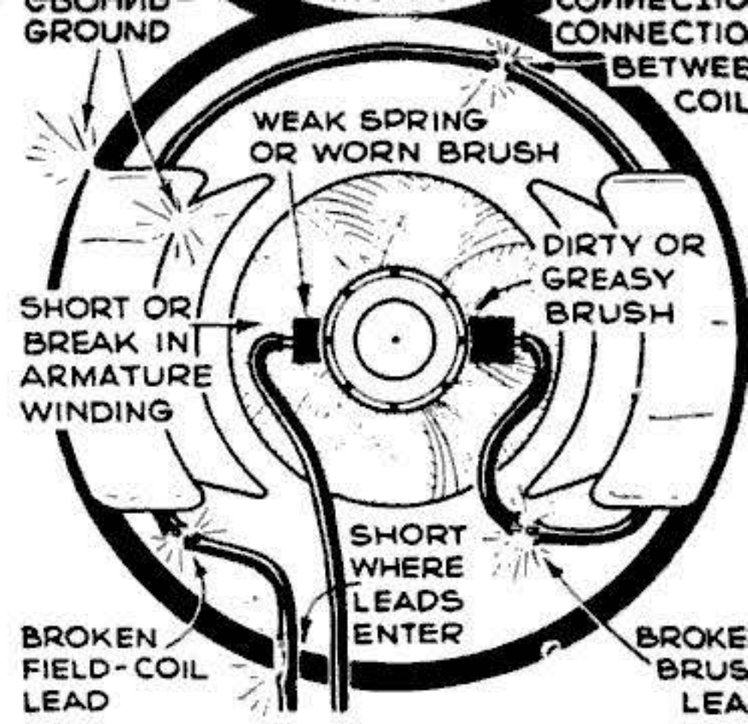
Startled, Bud looked closely at the leads. "I guess I did—yeah, this one!"

"Switch it around and see what happens."

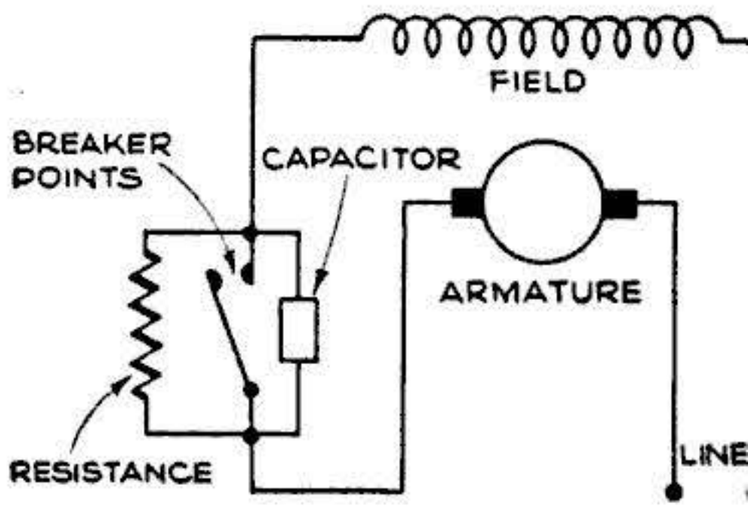
Balance of power. Bud changed around the two coil leads, and after Cam had stood the nail between the poles again, applied the prods. The nail stayed upright.

"Why didn't it do that before?" I asked.

"Both poles were the same polarity," said Cam, "so the top one repelled instead of attracting the nail. The

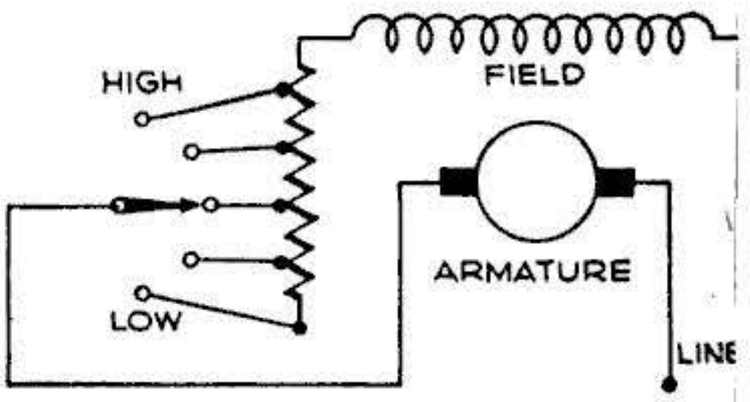


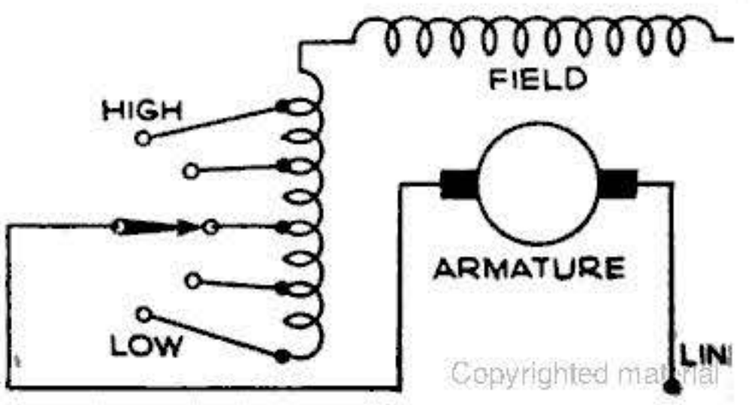
TROUBLE SPOTS. If lamp test shows an internal ground, check points shown above. Inspect all leads for frayed spots. If test lamp does not light with prods on motor terminals (with switch on), check points indicated above for open circuit.



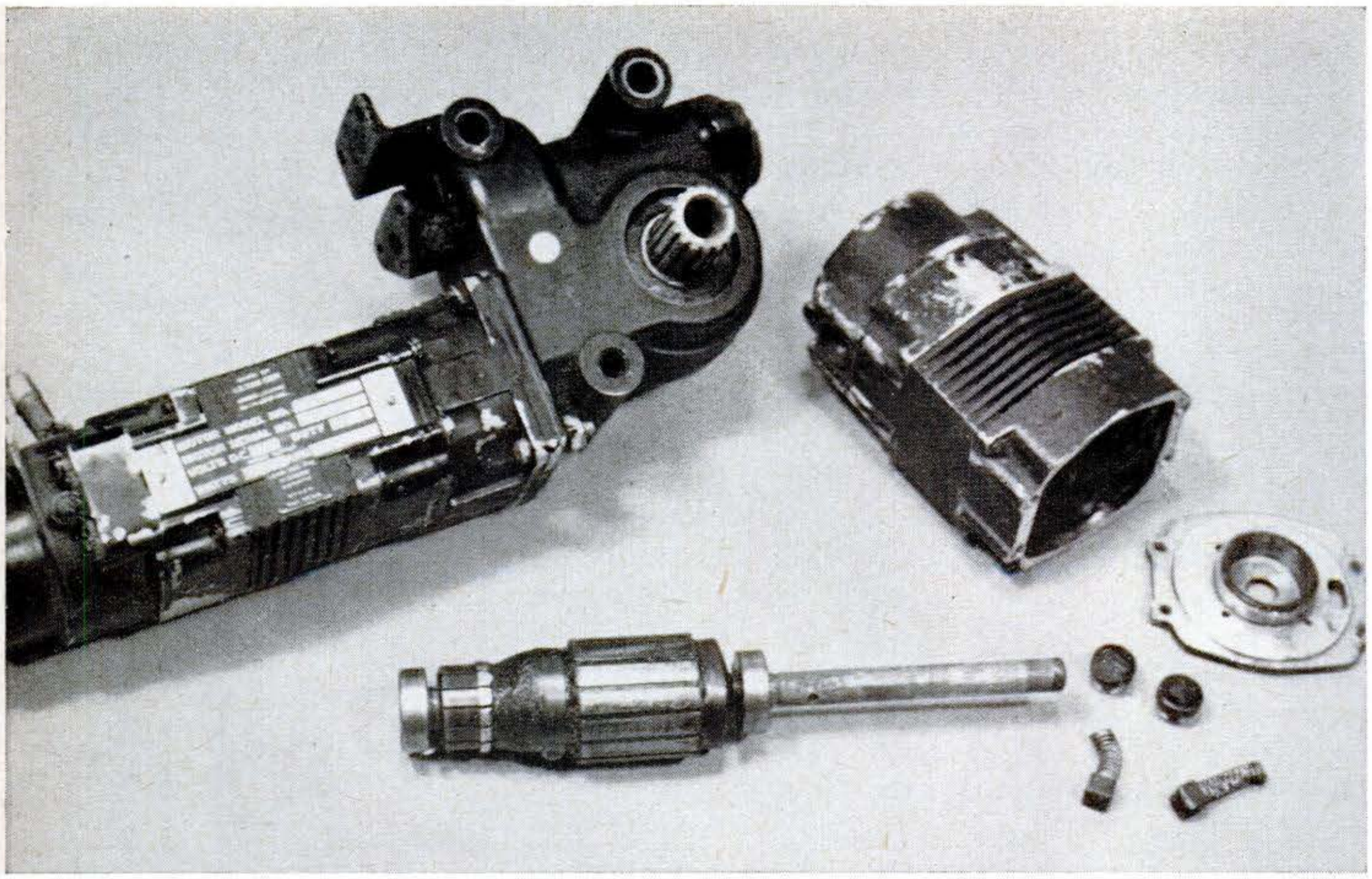
CENTRIFUGAL SPEED CONTROLS on kitchen mixers afford up to 16 speeds. As revs go up, centrifugal switch opens, and current can flow only through the resistance. This slows down the motor until points close and speed it up again. Cycle is so rapid that speed stays constant. Control knob alters spring tension on the points, making them open at higher or lower speed. Capacitor reduces arcing.

TWO OTHER METHODS of speed control: One, directly below, uses a tapped resistance. The control switch cuts all or part of it into the circuit, or for high speed cuts it out altogether. Tapped-field method at bottom has taps at various points of one field coil, usually wound in sections with different wire sizes. Switch cuts in more or less of this coil, which is connected to buck rather than reinforce the main field.

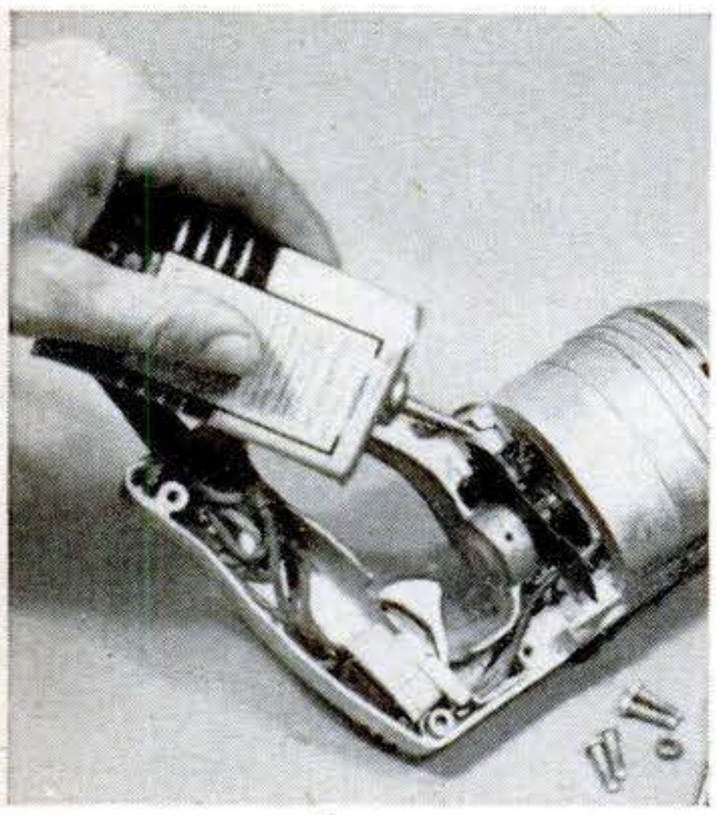




Copyrighted material



WAR-SURPLUS MOTORS like this are of top quality, and often a good buy. Permanent-magnet type should be run on DC only. Wound-field motors like that above work on AC or DC and can be altered to shunt connection for use on about half rated voltage. Some have limit switches that stop the motor after the output shaft has traveled a certain distance, but still allow the motor to be reversed.



DRY BEARINGS can sap the power of the best motor, but lubricate sparingly. Over-oiling may foul brushes. The handle must be opened to oil this drill.

field poles in a motor must be of opposite polarity."

"Thanks a lot," said Bud. "Now I'll use my drill to mount those shelf brackets for you."

He tore off. Cam wrapped cord over the commutator leads of my armature "to keep them from flying off the handle again," as he put it. He was shellacking the cord when a sort of Comanche war whoop rang out.

We swung around in time to see Bud save his drill from crashing to the floor only by a wild grab at the cord. It was still running. Instead of switching it off, he yanked out the plug.

Groundless claim. "Whew! My hand's still buzzing," Bud said as he brought the drill over. "This ground wire you said should prevent shocks—it sure didn't."

"Sure you had it grounded?" asked Cam.

"Yes, *sir*."

"You mean that short extra wire near the plug?" I asked. "What's that for? My drill has none."

"Yours is an older model," said Cam. "It's a safety measure. You can add it to yours."

"What for? It runs fine."

"To save yourself a shock if your motor should develop an internal ground. That's what you have if insulation fails, a winding touches a core, or a lead or brush holder makes contact with the case."

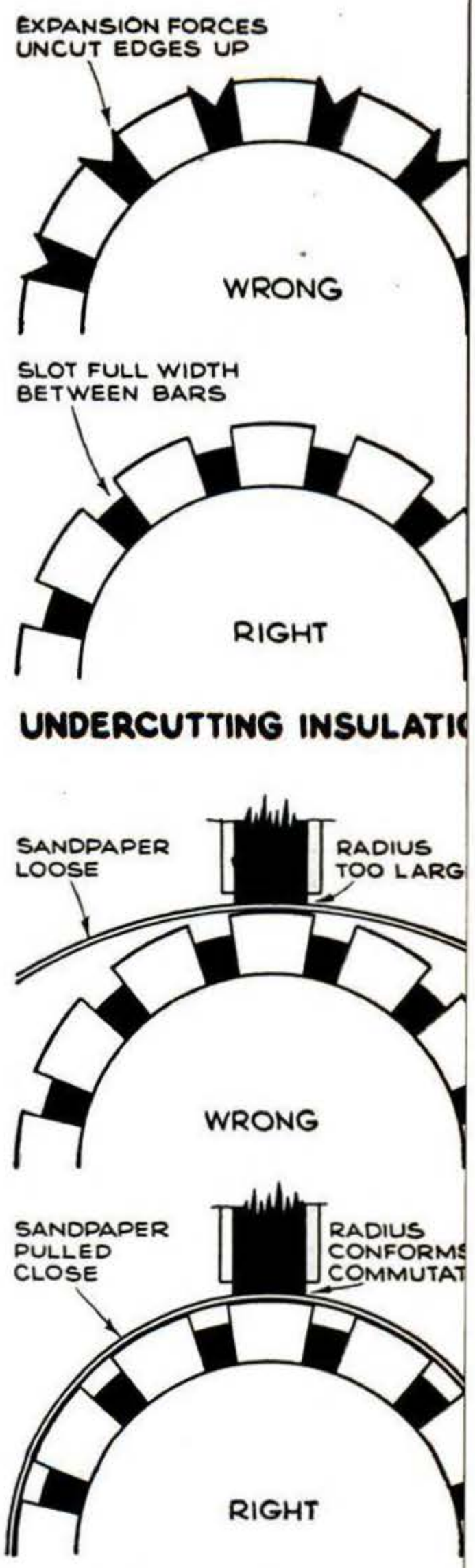
"Wouldn't that keep the motor from running?"

"Not necessarily. But if the drill touches a radiator, water pipe or other earth ground, it might blow a fuse.

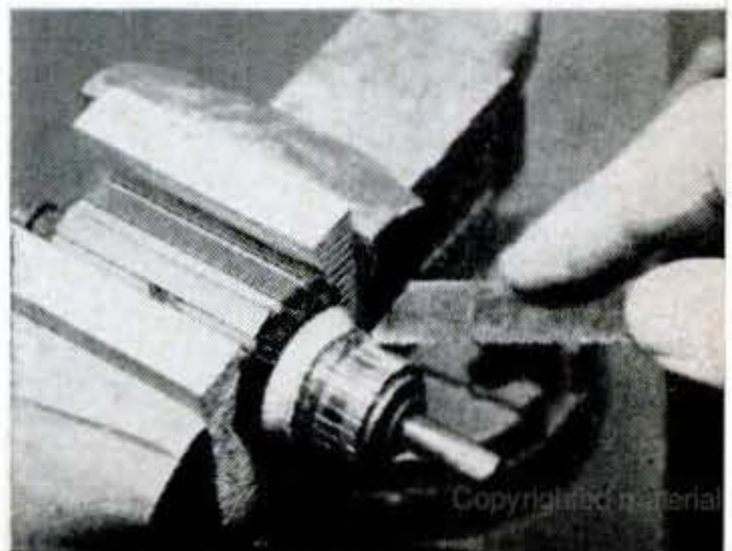
Copyrighted material

TROUBLE-SHOOTING CHART
(Universal Motors)

SYMPTOMS	POSSIBLE CAUSES	REMEDIES
Motor lacks power	Dry bearings	Lubricate sparingly.
	Bearings binding	Realign end plates.
	Armature dragging against field poles	Install new bearings.
	Oily commutator	Clean commutator and brushes with carbon tetrachloride.
	Worn brushes or weak brush springs	Replace brushes, springs or both.
	Defective speed control	Clean and check.
Motor overheats	Dry or binding bearings, dragging armature	Lubricate, realign or replace bearings.
	Internal short in field coils	Check with ohmmeter. Rewind if necessary.
	Internal short in armature winding	Check on growler. Rewind if necessary.
	Low voltage	Check line voltage, motor cords and connections.
	Vents clogged	Blow out dirt. Dismantle motor if necessary.
Excessive sparking at brushes	Rough commutator	Turn smooth on lathe and undercut mica.
	Carbon on commutator	Polish with fine sandpaper.
	Poor brush seating	Reseat brushes.
	Weak brush springs (may be due to overheating)	Replace springs, check operating temperature.
	High mica	Undercut commutator.
	Wrong rotation for brush setting	Reverse motor or shift brushes.
	Brush setting altered (in case of movable brush assemblies)	Shift brushes until sparking ceases.
	Opened or shorted armature winding	Check on growler, repair as necessary.
Motor dead at some armature positions	Open circuit in armature winding (motor will also lack power and spark excessively)	Check and repair as necessary.
	High mica at one or more points	True and undercut commutator.
	Sticking brushes	Clean with carbon tetrachloride.



TO RECONDITION a commutator, mount it between centers or in collets in lathe. Turn smooth and parallel, removing as little metal as possible. Clamp armature in vise with wooden pads, as below. Cord wrapped around commutator leads keeps them from pulling out at high speed. Grind hacksaw teeth same width as mica for undercutting. Seat brushes as shown above. When disassembling a motor, note position of brushes. If commutator does not need servicing and brushes are not worn too short, they can be re-used. Insert them in original position.



One side of your power line is grounded at the meter, so the current could hop off at the internal ground inside the drill, and go back through the pipe to the meter."

No internal ground. Bud had laid the drill on the bench. Now he held one test prod on both plug prongs, and the other to the drill housing. The lamp did not light.

"Look," he said. "There's no internal ground."

"Hold it," I asked. "I still don't see what good that third wire does."

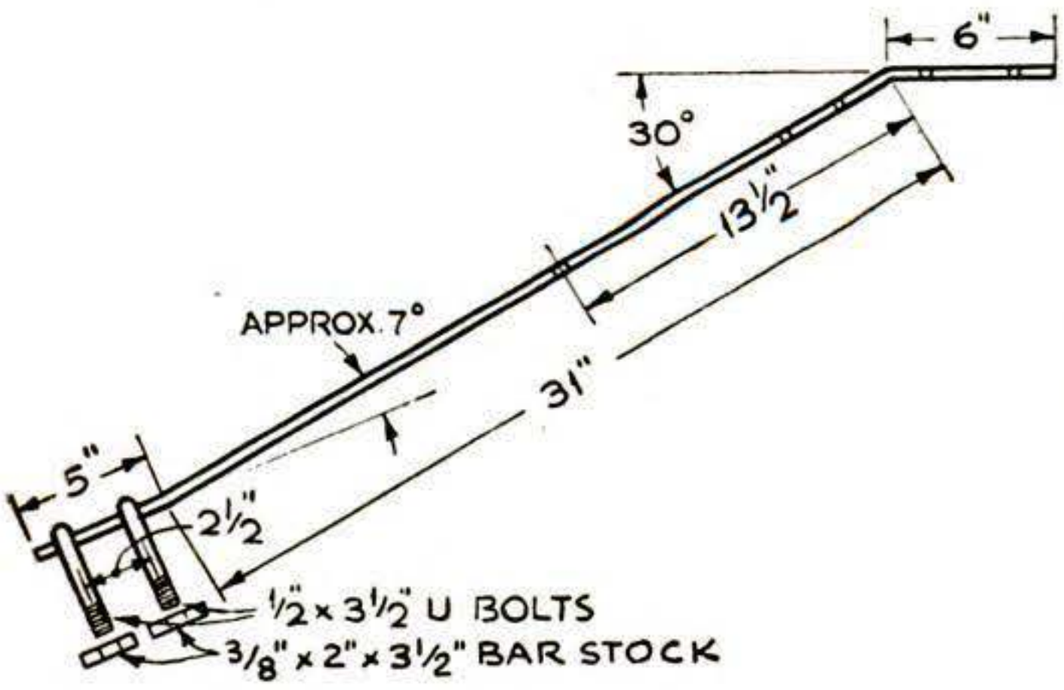
Cam grinned. "Suppose your drill, with an internal ground, didn't touch a pipe or radiator, but *you* did. The current would go through you. If you were standing on a wet basement floor, or on damp ground, you wouldn't even have to touch anything. But with the

[Continued on page 234]

Auto Parts Put Spring in Toy Bronco When Rider Hops On

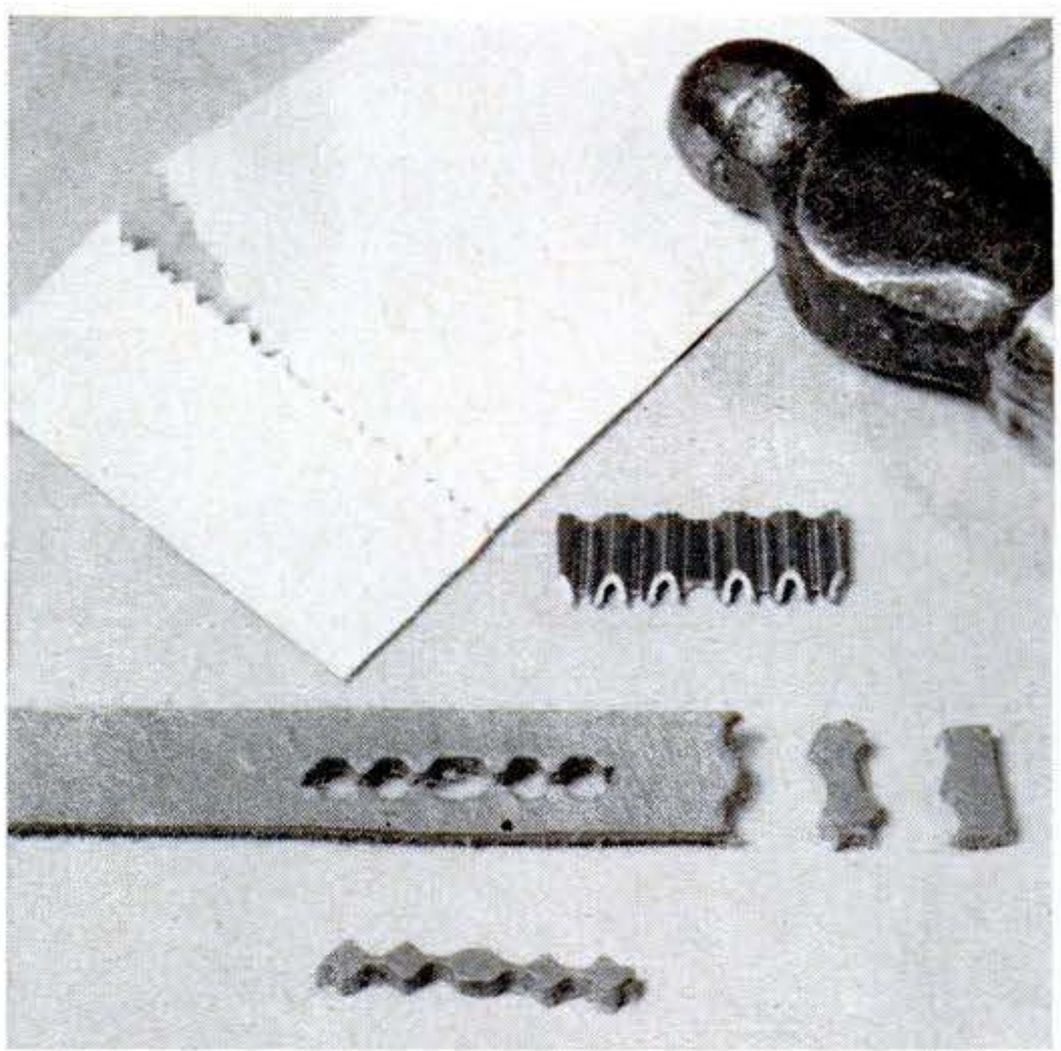
My youngsters envied their neighbor's hobby horse so much that I decided to make them one that was better. Auto-spring leaves put real bounce into the footing. For the seat mounting I had a 42" length of ⅜"-by-2" bar stock bent and drilled to take bolts for securing the horse's head, seat and footrest, all jigsawed out of plywood.

A wooden block holds the metal pieces apart, and two U bolts secure the sandwich. *—M/Sgt. R. Seidel, Fort Leavenworth, Kan.*



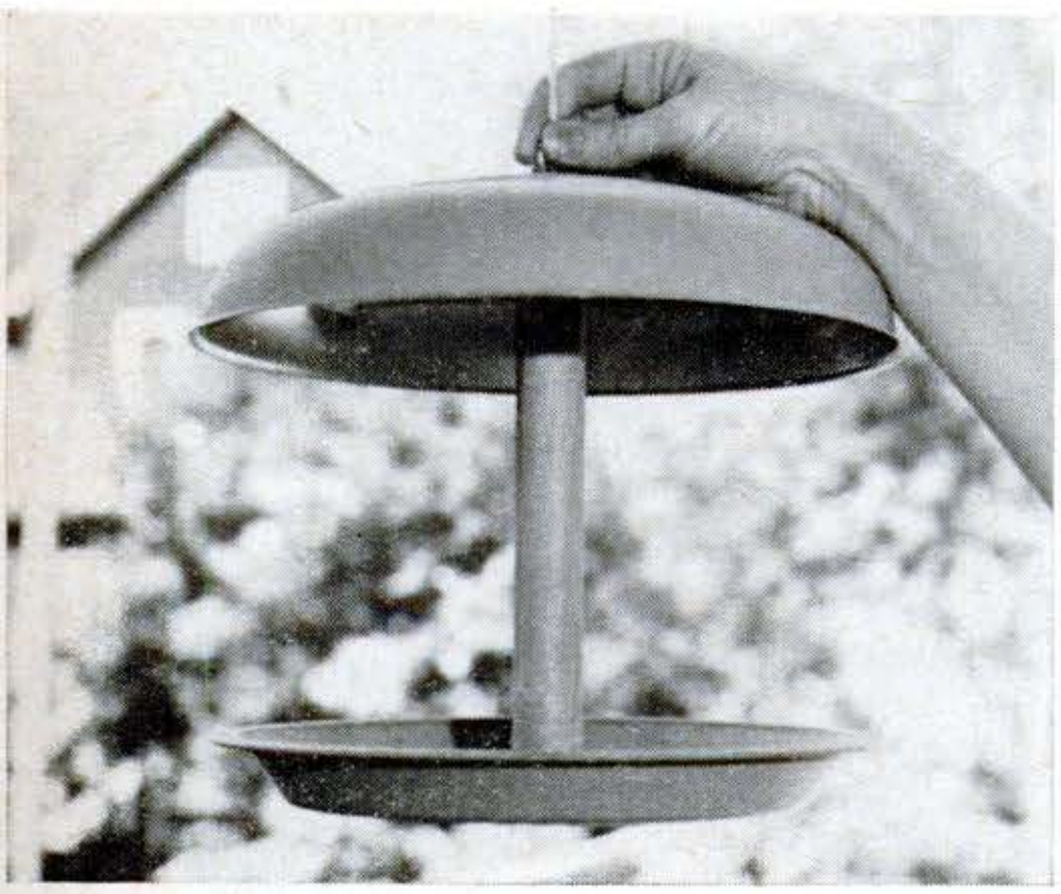
Tape De-lints Jewel Boxes

Remove lint from the velvet lining of a jewel box by inserting a loop of cellulose tape, sticky side out, in a clothespin and dabbing it on the velvet as shown above.



Fastener Cuts Fancy Designs

You can cut decorative designs in leather, cardboard or other soft materials with an ordinary corrugated fastener. To cut perforations in paper or cardboard, punch only the teeth through the material.

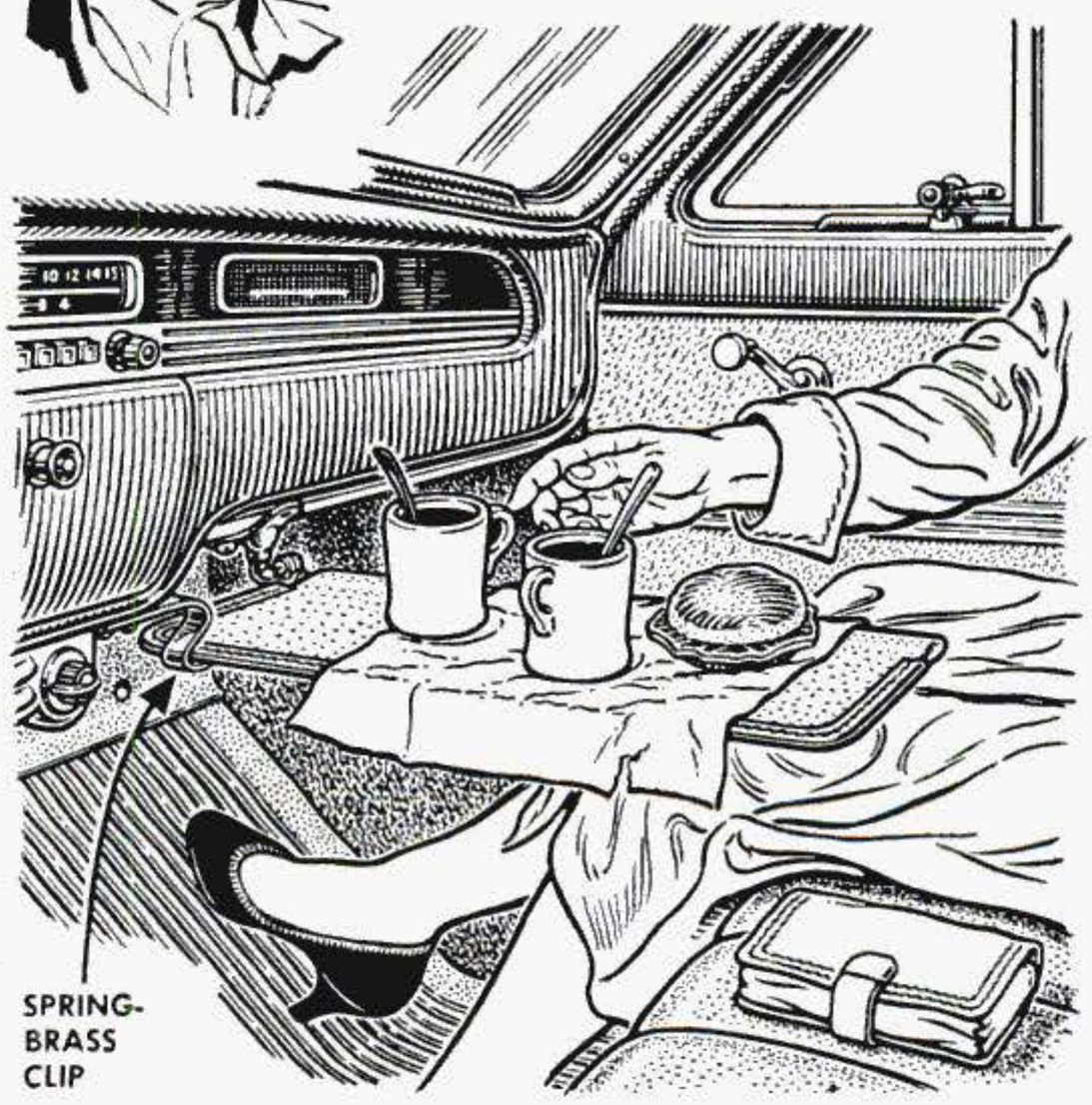


Old Pots Make Bird Feeders

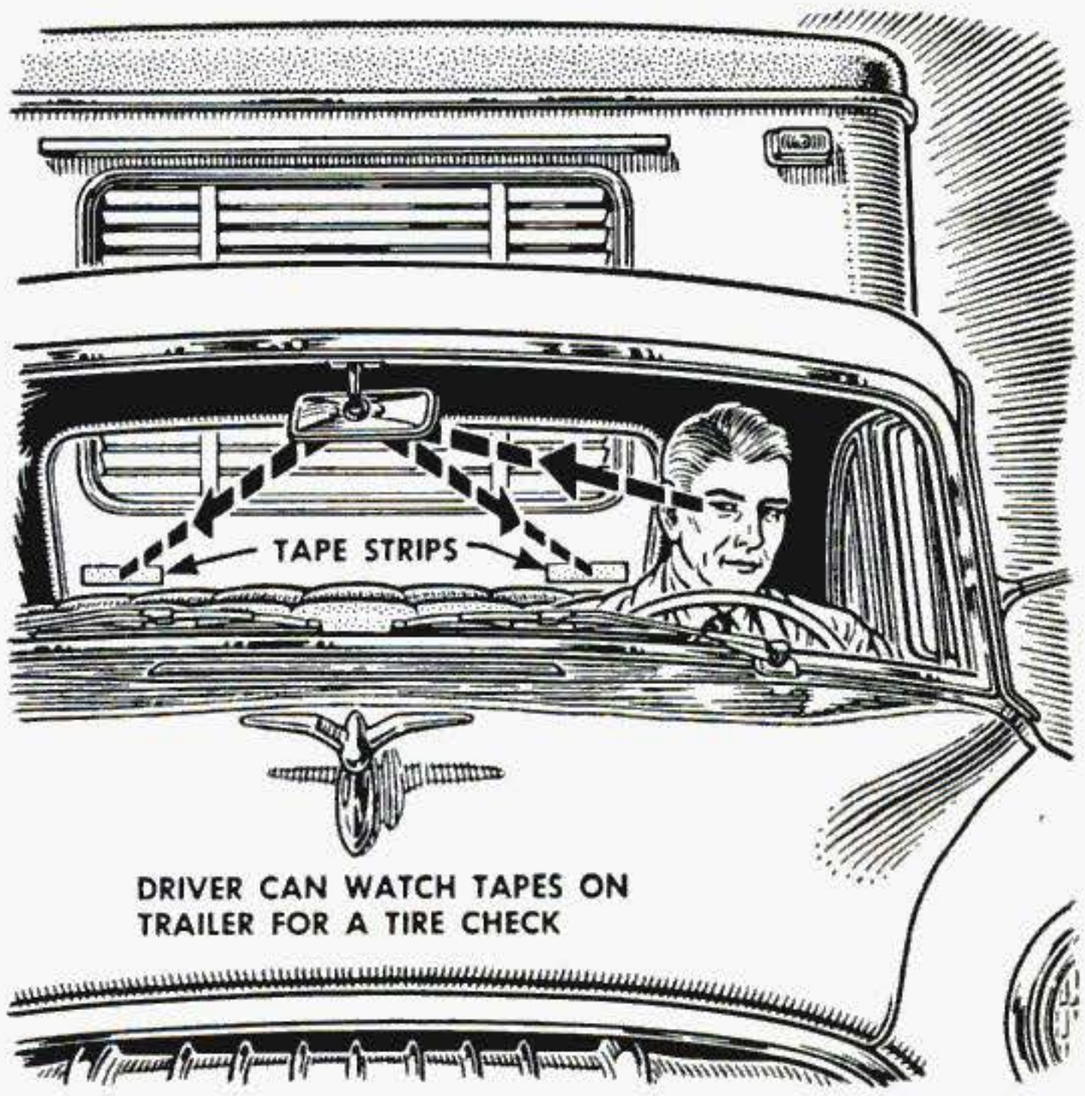
Want a simple bird feeder? Screw a discarded pot cover to one end of an 8" length of broomstick and an old pie tin to the other end, as at left. Use a screw eye on top for attaching string to hang it from a limb.

Copyrighted material

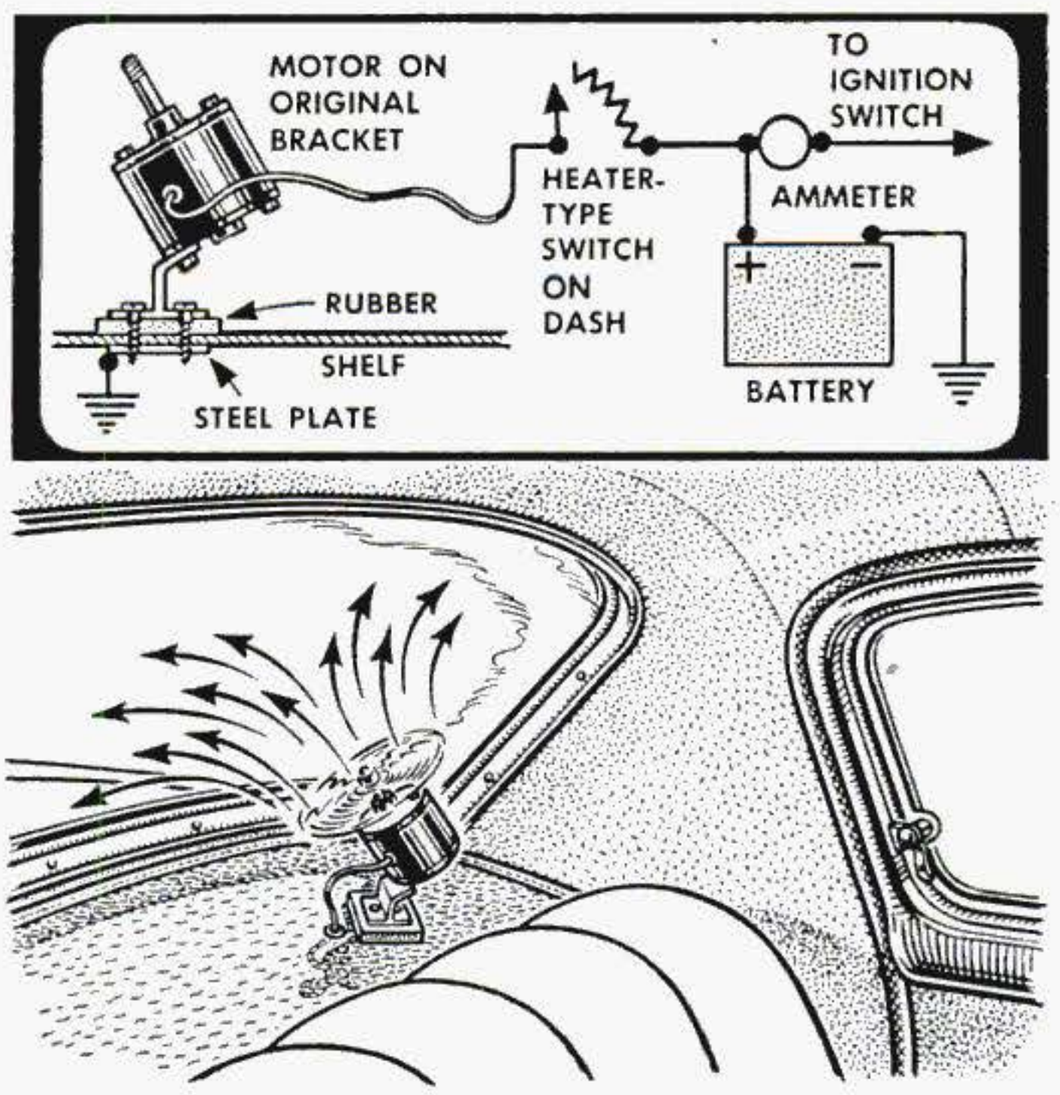
Hints FROM THE MODEL GARAGE



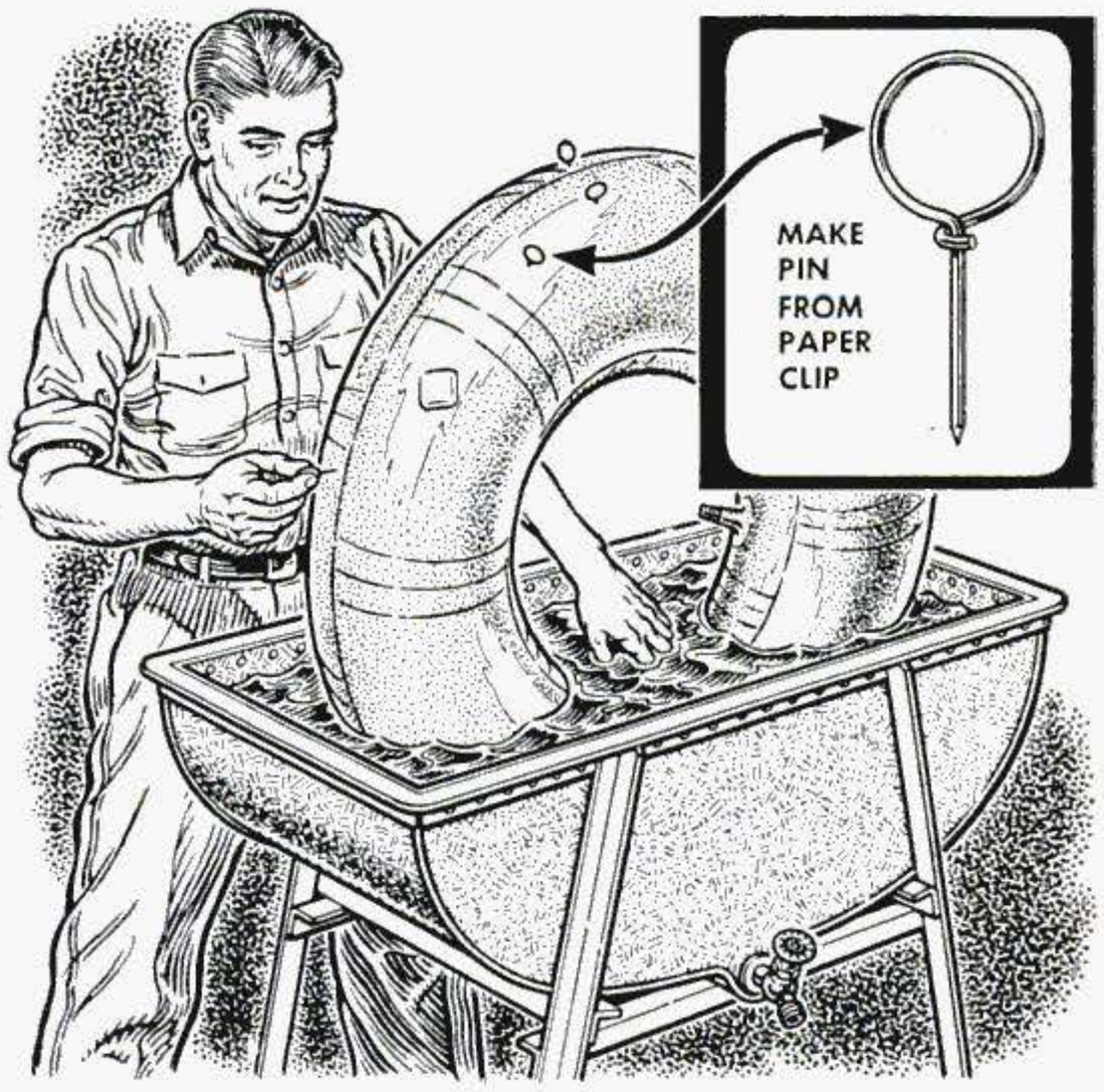
A handy snack table for two is easy to make from an old sun visor. Position and bolt the bracket to the dash so that the visor swings under it when not in use. Use a second, U-shaped bracket to support the downward-hinging edge of the extended visor.



When a trailer has a flat, it's hard to see it from the tow car. Place two strips of tape on the trailer front where you can see them in the rear-view mirror just above the lower edge of the car window. If a strip drops out of sight you know there's a flat.



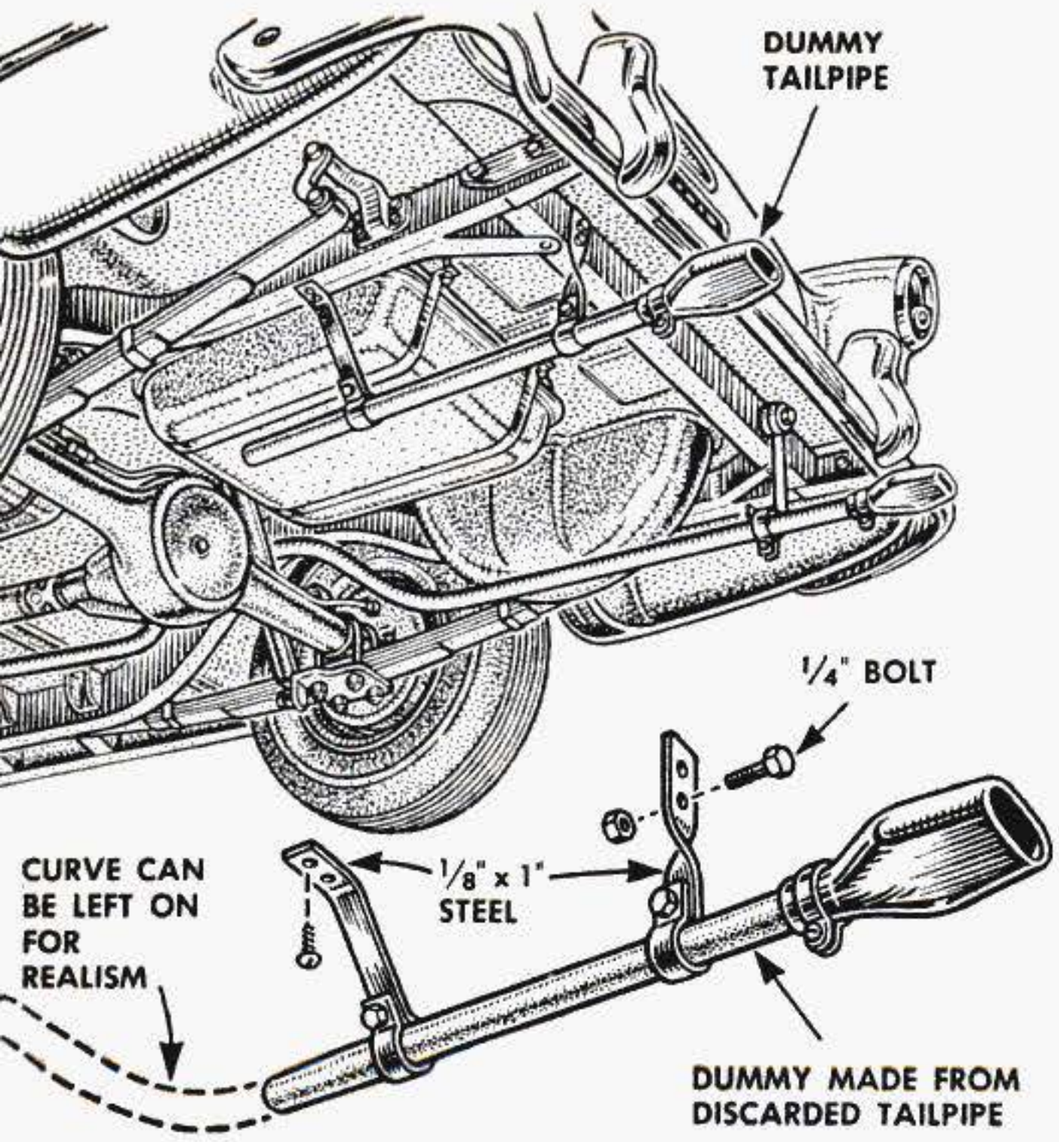
For a rear-window defroster, attach an old car-heater fan to the parcel shelf. Cushion it with rubber. Use a grounded metal plate under the shelf as a screw anchor. Rig a variable-resistance switch on the hot side of the ammeter to feed the motor.



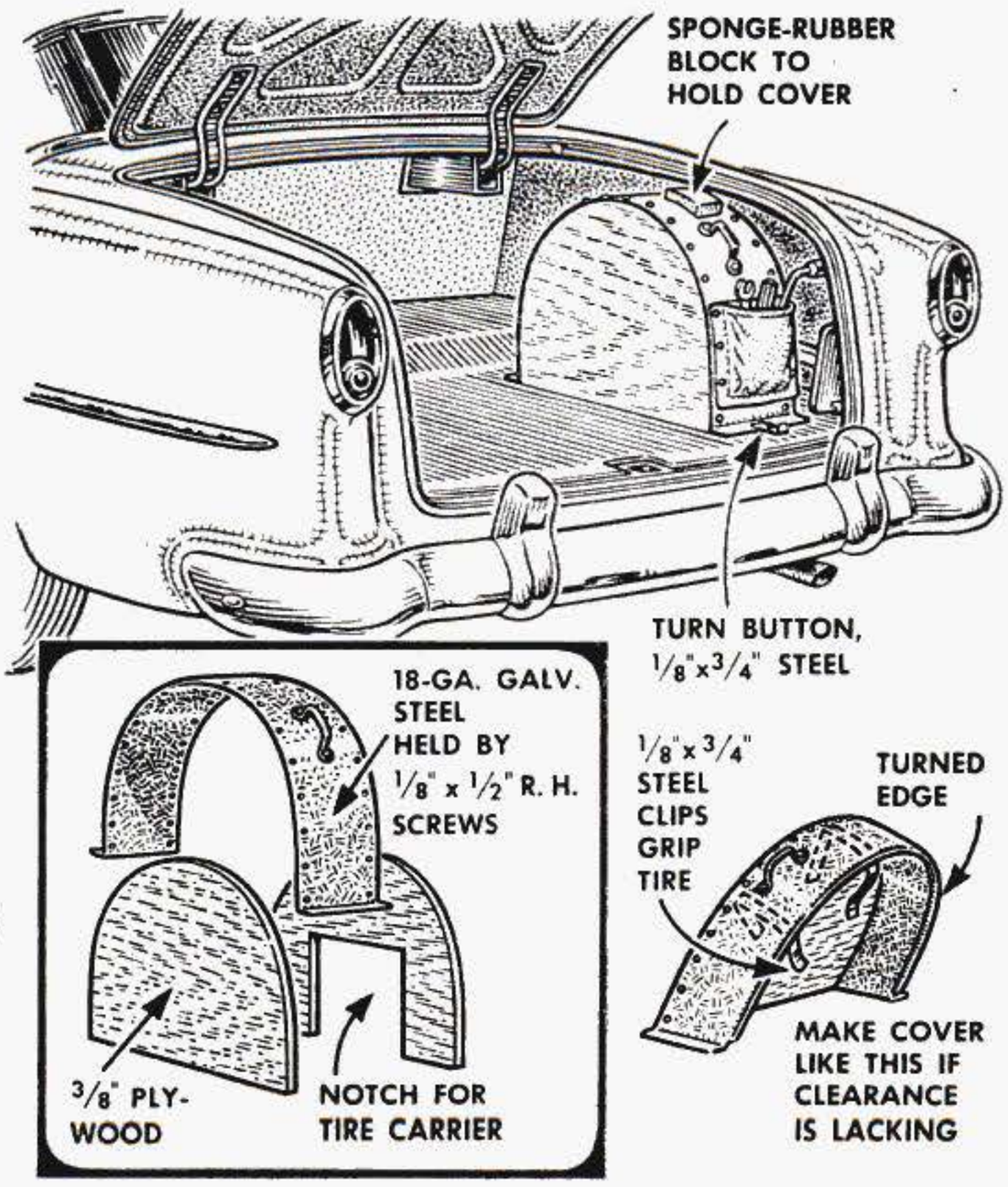
To mark leaks in tubes, one garageman twists skewer-shaped pins from stiff wire. He hangs them on a peg near the test tub and inserts one in each puncture he finds. When he gets around to repairing the tube, he replaces the pins on the peg.

Please turn the page for more auto hints

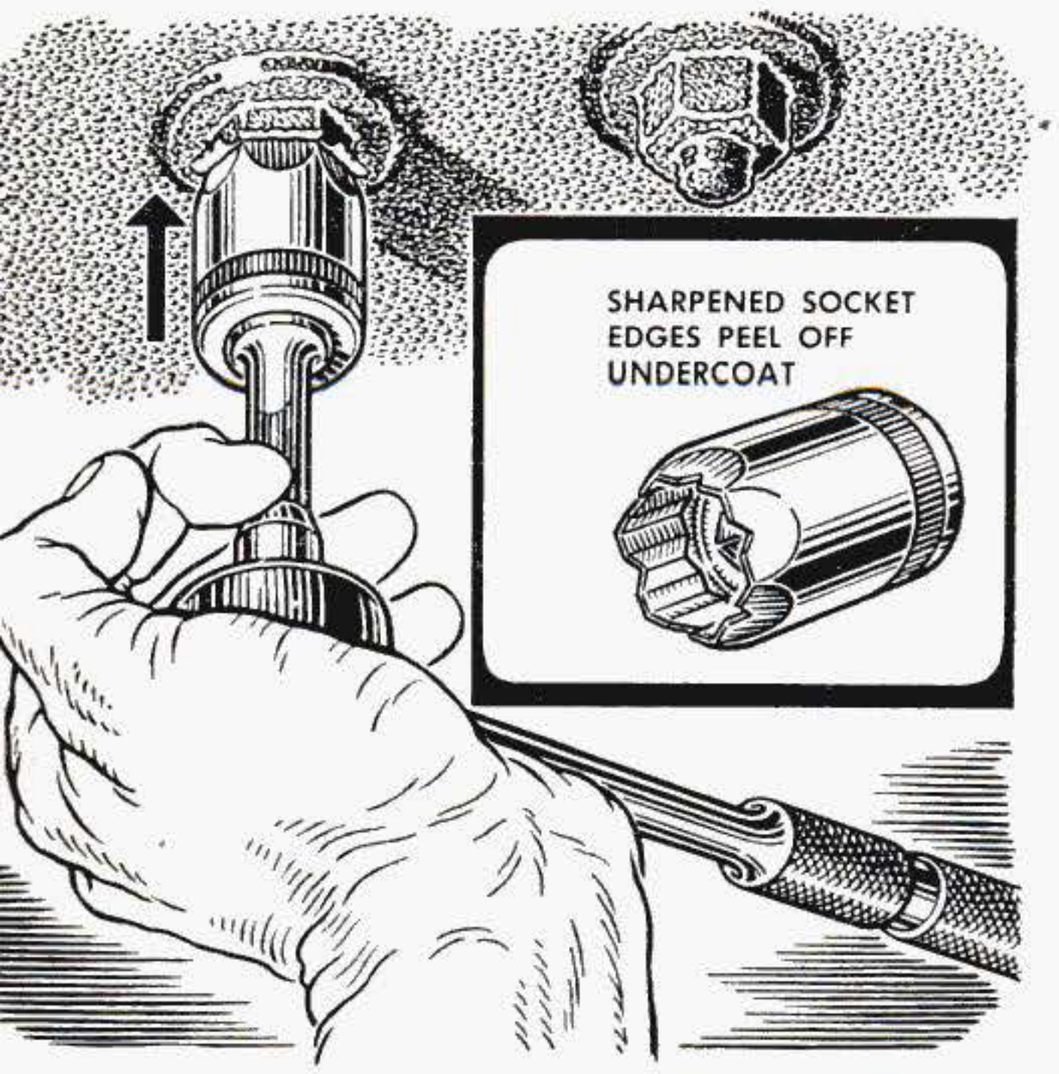
MORE Hints from the Model Garage



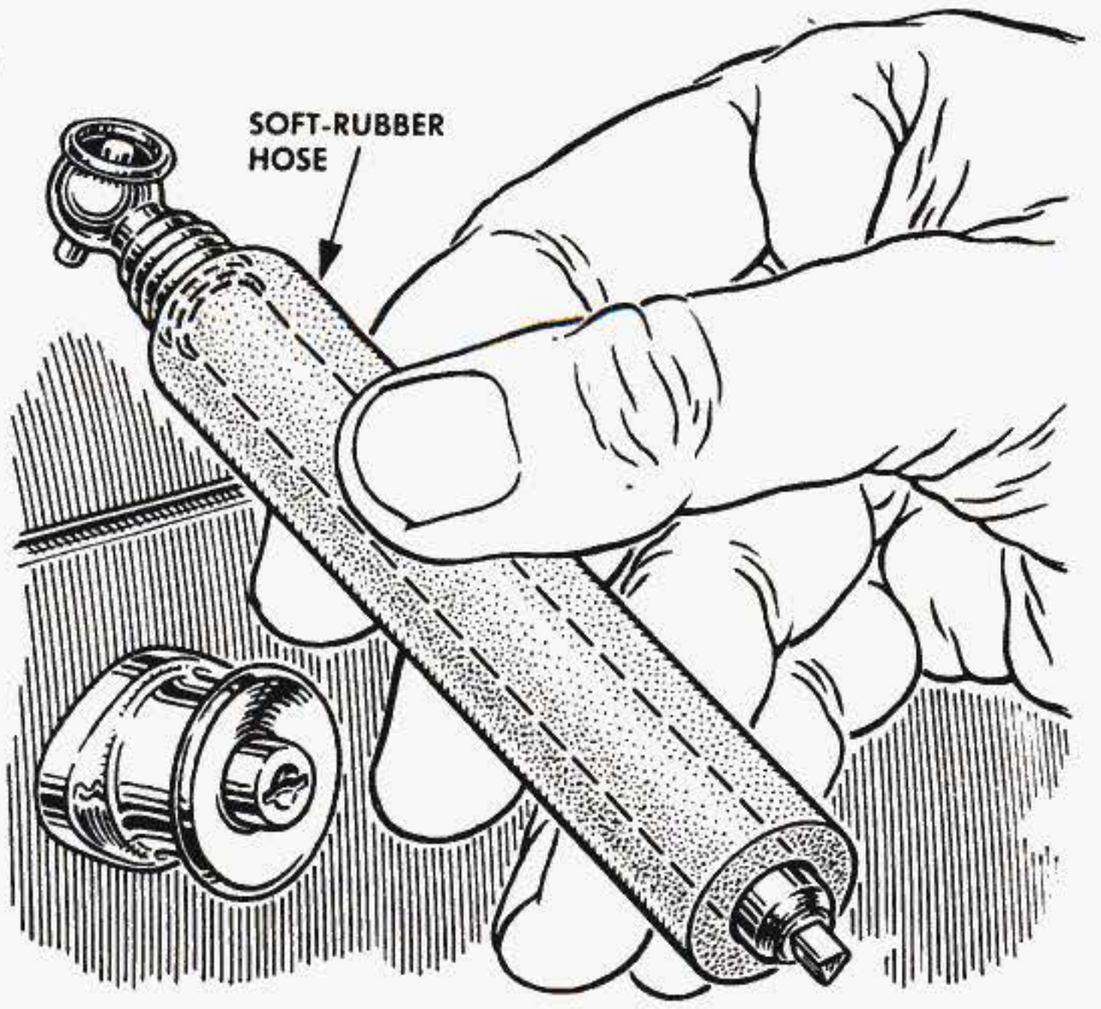
That dual-exhaust effect for the going-away view can be produced this way if you don't want the real thing. Scrounge around an auto junk yard until you find a suitable tailpipe. Then bracket it opposite the real one and clamp on twin chrome extensions.



A tire cover like this will help keep a trunk compartment clean and prevent smudges on clean luggage or packages stored there. A dirty tire and wheel ought to have a good washing before going into the trunk, but there's seldom a chance for this.

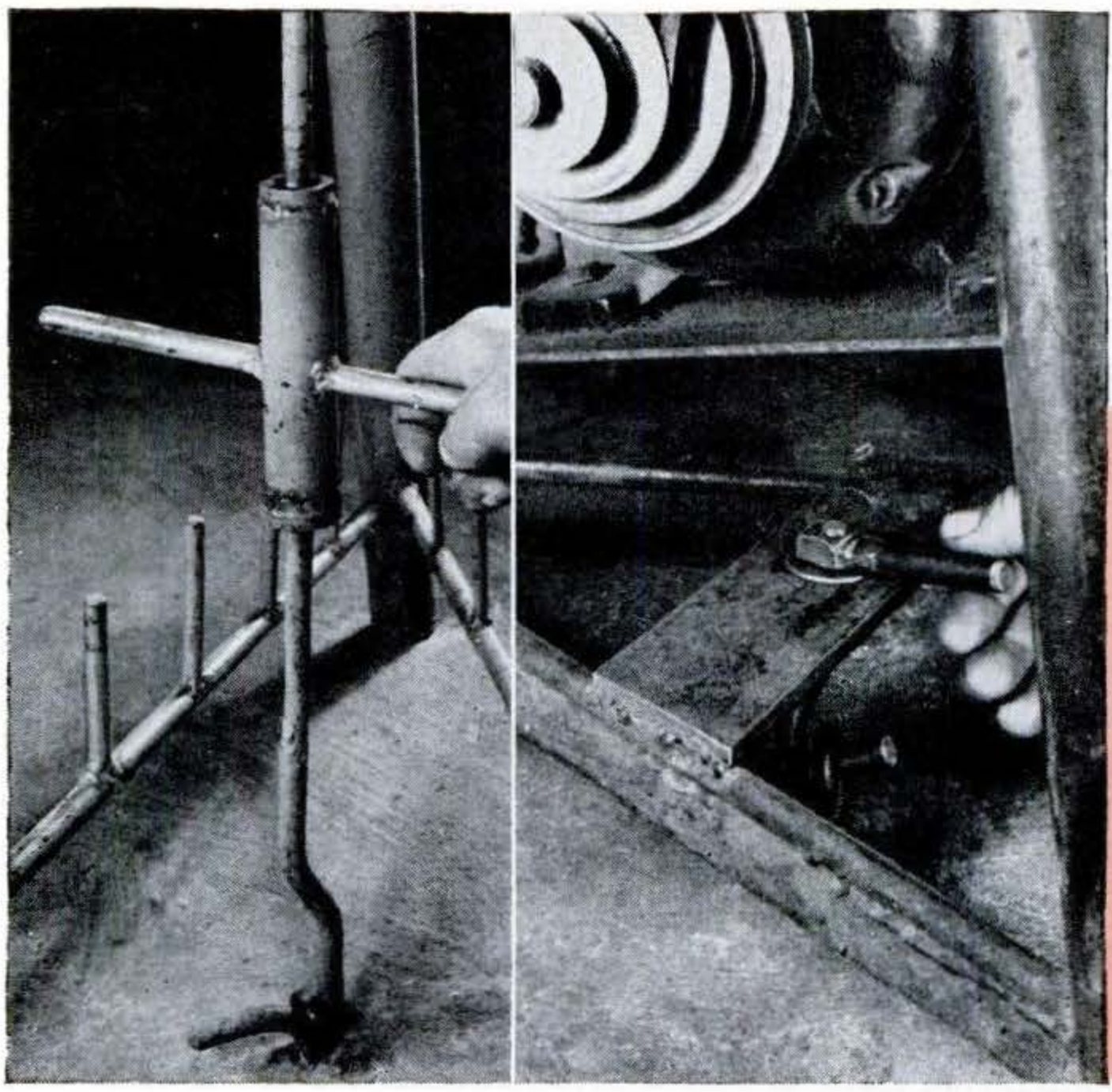


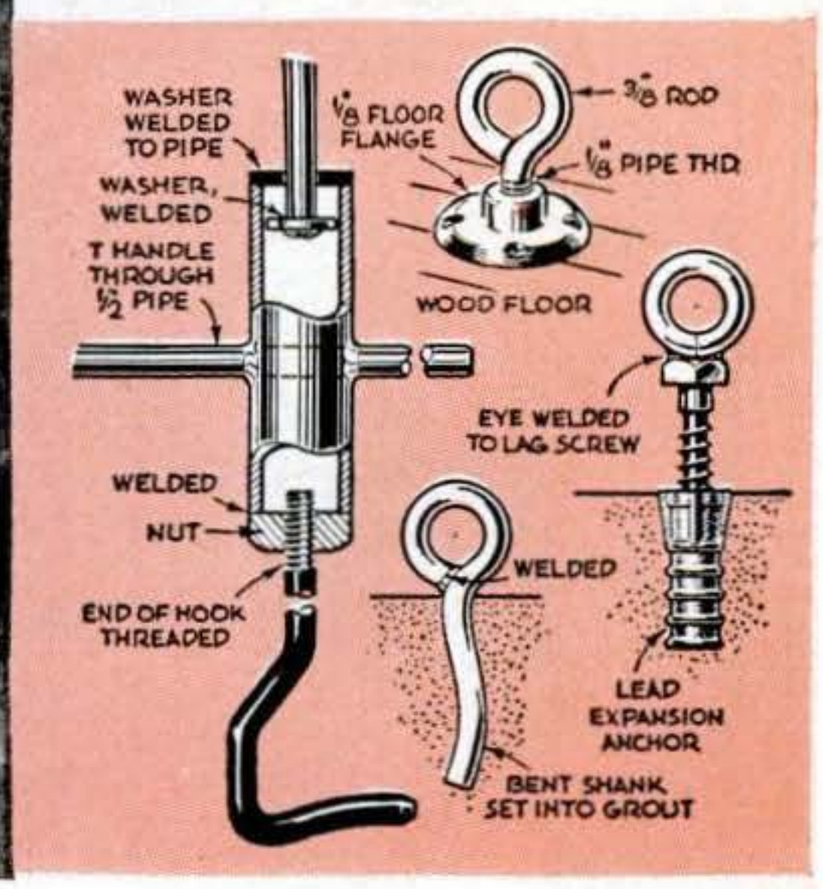
Hard undercoating makes it difficult to remove body and fender bolts from a car that has had a heavy application. To speed the operation, one shop owner uses sockets ground to a sharp edge like this. The knife edge cuts right through the coating.



A tire gauge carried in a toolbox or the glove compartment will be protected and won't cause an annoying rattle if you locate rubber hose of the right diameter, cut off a piece and slip it on the gauge. You can take readings without removing it.

NEW Shop Ideas





Securing Shop Stands. Three-legged stands in our shop are firmly anchored by the two methods shown in the photos above.

The method pictured at the extreme left uses a hook fastener and a tightening sleeve. As the T handle is turned, the sleeve swivels on the upper rod and draws the threaded hook against an eye set in the floor. No vibration or side pressure can move a stand that is fastened in this way.

The other method requires a plate bolted or welded across the lower rails of the stand. A ½" steel rod, formed into a hook at the lower end and threaded at the top, is drawn up by a nut on top of the plate. A handle is welded to the nut.

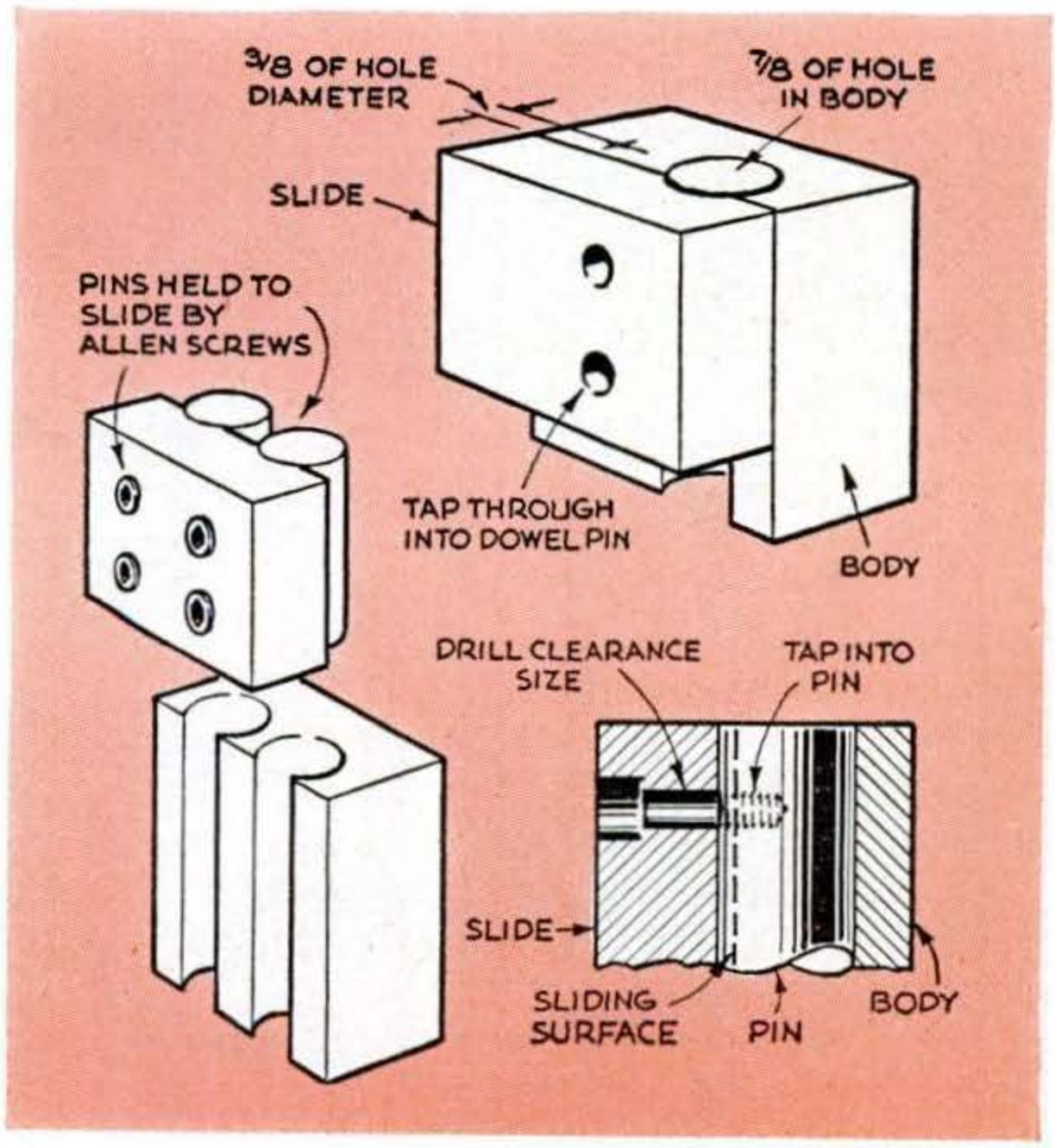
We make the floor eyes from ⅜" rod, welding the loop for added strength. The drawing above shows three ways of anchoring them.—*Ken Hadenfeldt, Storm Lake, Iowa.*

Easily Made Tool Slide. Dovetail slides can be made only by milling or shaping. But by using steel dowel pins you can make accurate tool slides on your drill press.

Clamp the sliding surfaces together. At one end, lay out one or more holes with one-eighth of their diameter in the slide and seven-eighths in the body. With the joint parallel to the drill-press spindle, drill and ream the holes to a close fit for the pins.

Before unclamping, insert a pin in each hole. Drill through the slide into the pins. Tap holes in the pins; then enlarge and counterbore the slide holes for Allen screws to hold the pins.

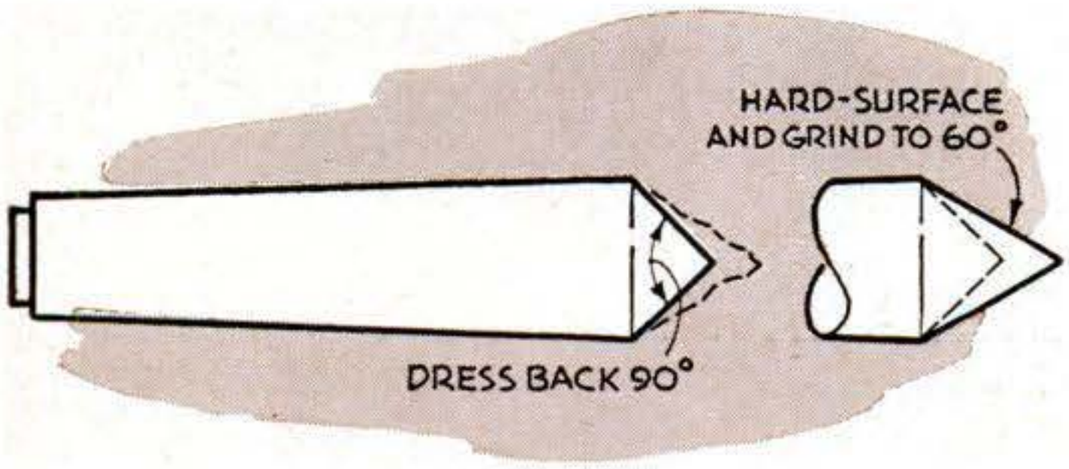
If the slide works too freely, remove the pins, wrap them with abrasive cloth, and lap the shallow grooves. This lets you "take up" the slide to any degree.—*R. J. Lemp, Sayville, N. Y.*



Please turn the page for more shop tips

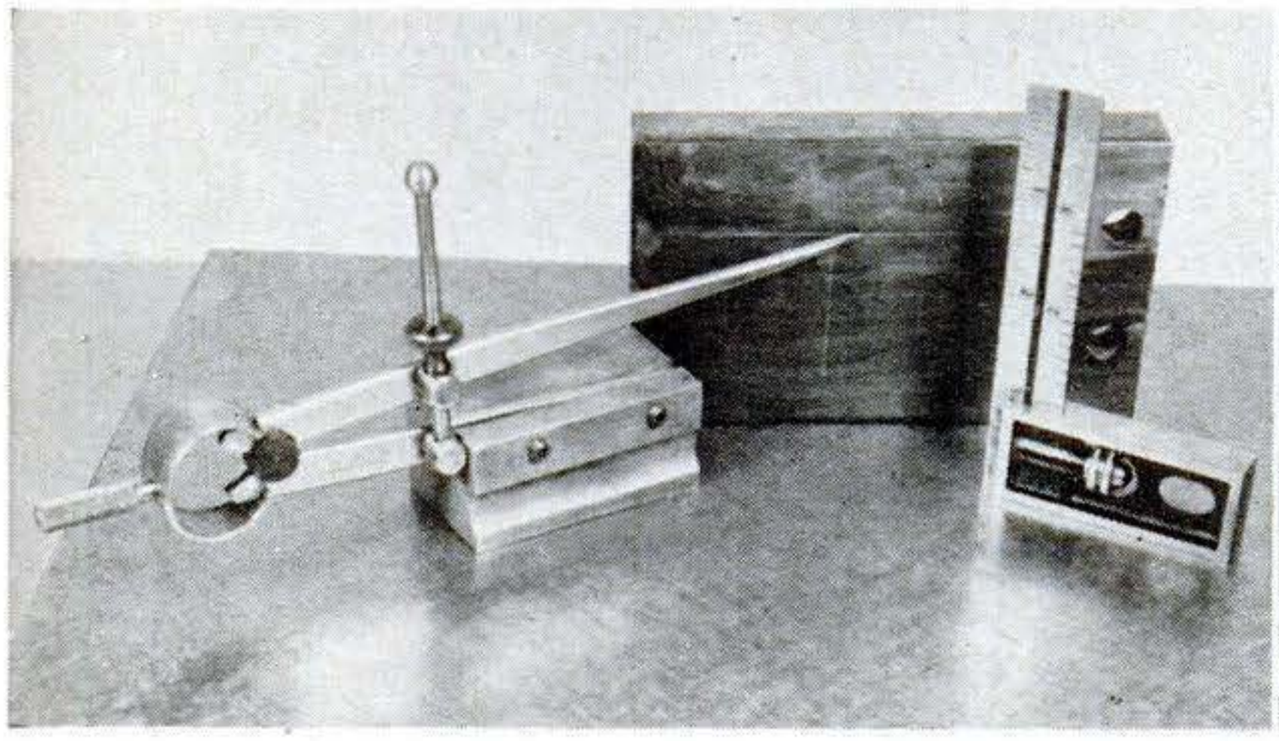
Copyrighted material

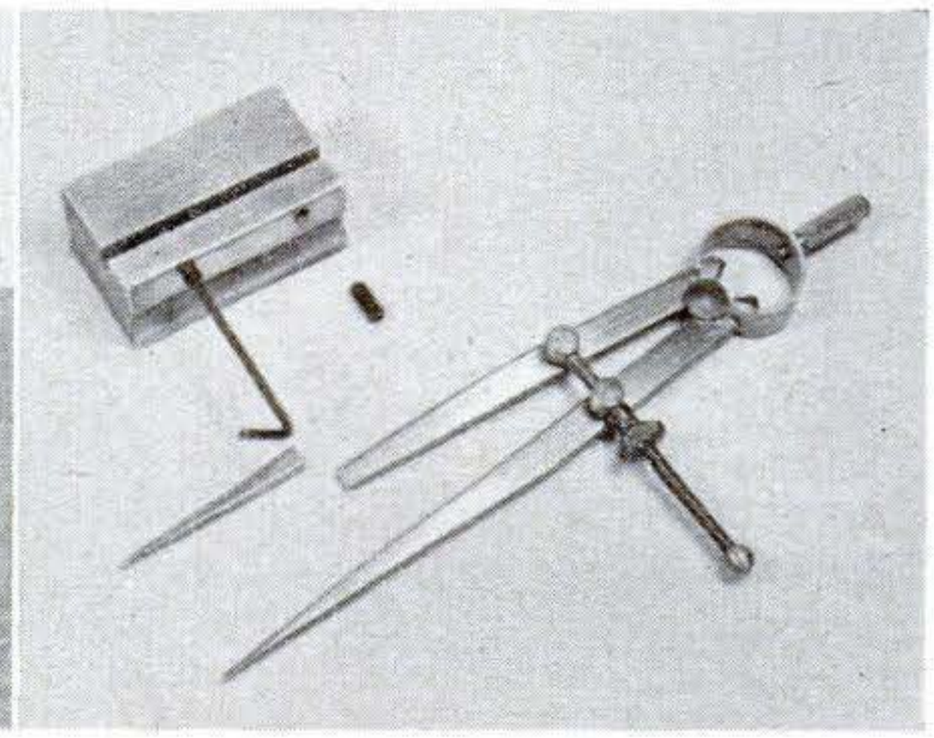
MORE SHOP TIPS



Renewing Lathe Centers. Damaged centers can be made better than new by hard-surfacing with Stellite or the like.

Rough-grind the point back at an angle of 90°. At a welding shop, have the tip hard-surfaced. Clean up by grinding; then in the lathe grind accurately to 60°. The point will withstand high heat and pressure, outlasting (in my experience) even high-speed centers.—*M/Sgt. James R. Wood, 465th Field Maintenance Squadron, A.P.O. 83, N.Y.*

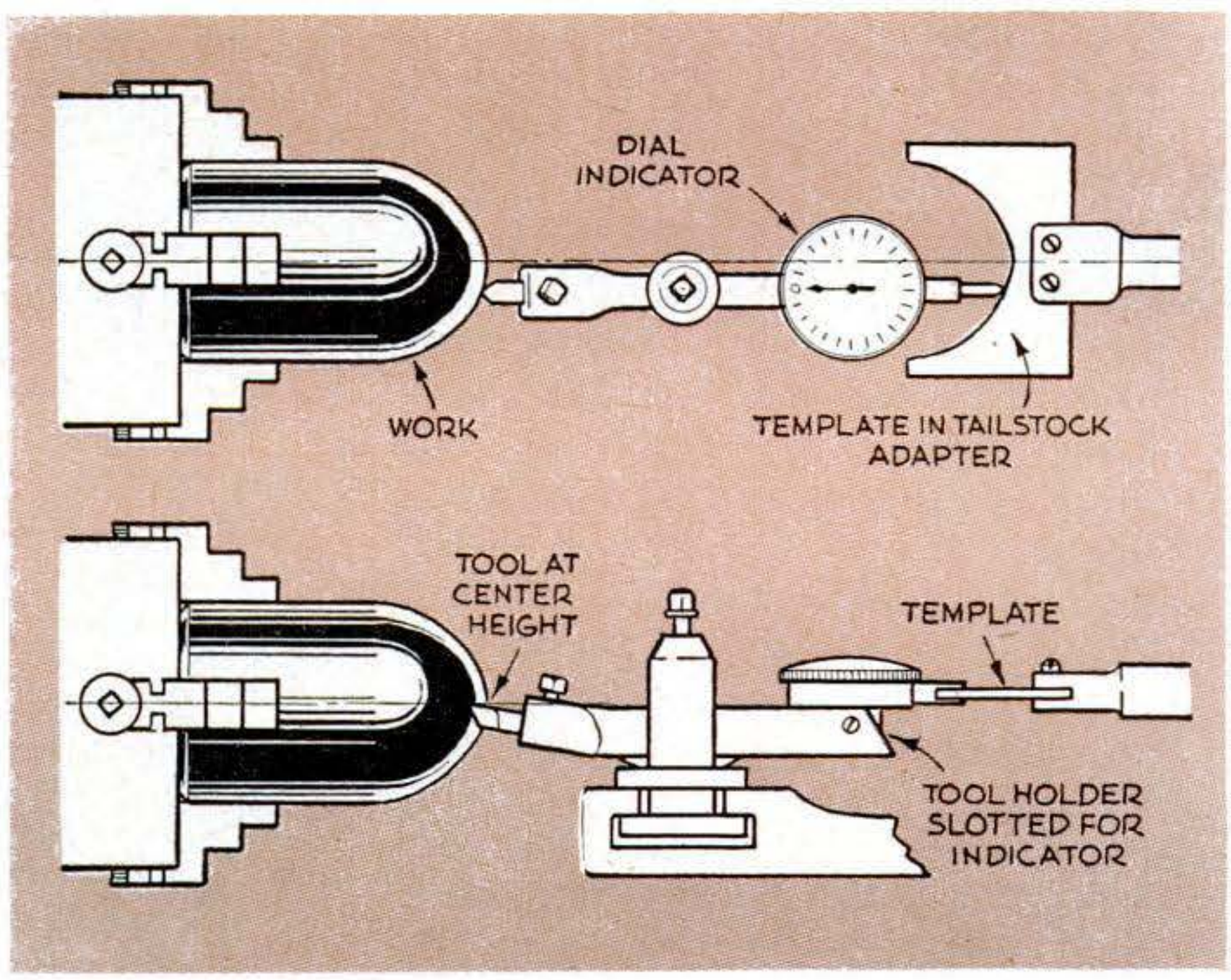




Make a Surface Gauge. Handy for small work in the home shop, this surface gauge is a quick job if you have a mild-steel block and a pair of dividers—the two major items needed to make it.

Slot the top of the block $\frac{3}{16}''$ by $\frac{1}{2}''$. Tap holes from one edge for setscrews. Cut one leg of the dividers short and clamp it in the slot at an angle as shown. The finger-grip grooves in the edges of the block are optional. For greatest accuracy, case-harden and grind or lap the bottom flat.

Turning Face Contours. Convex, concave and even compound curves can be turned with a template and a dial indicator.



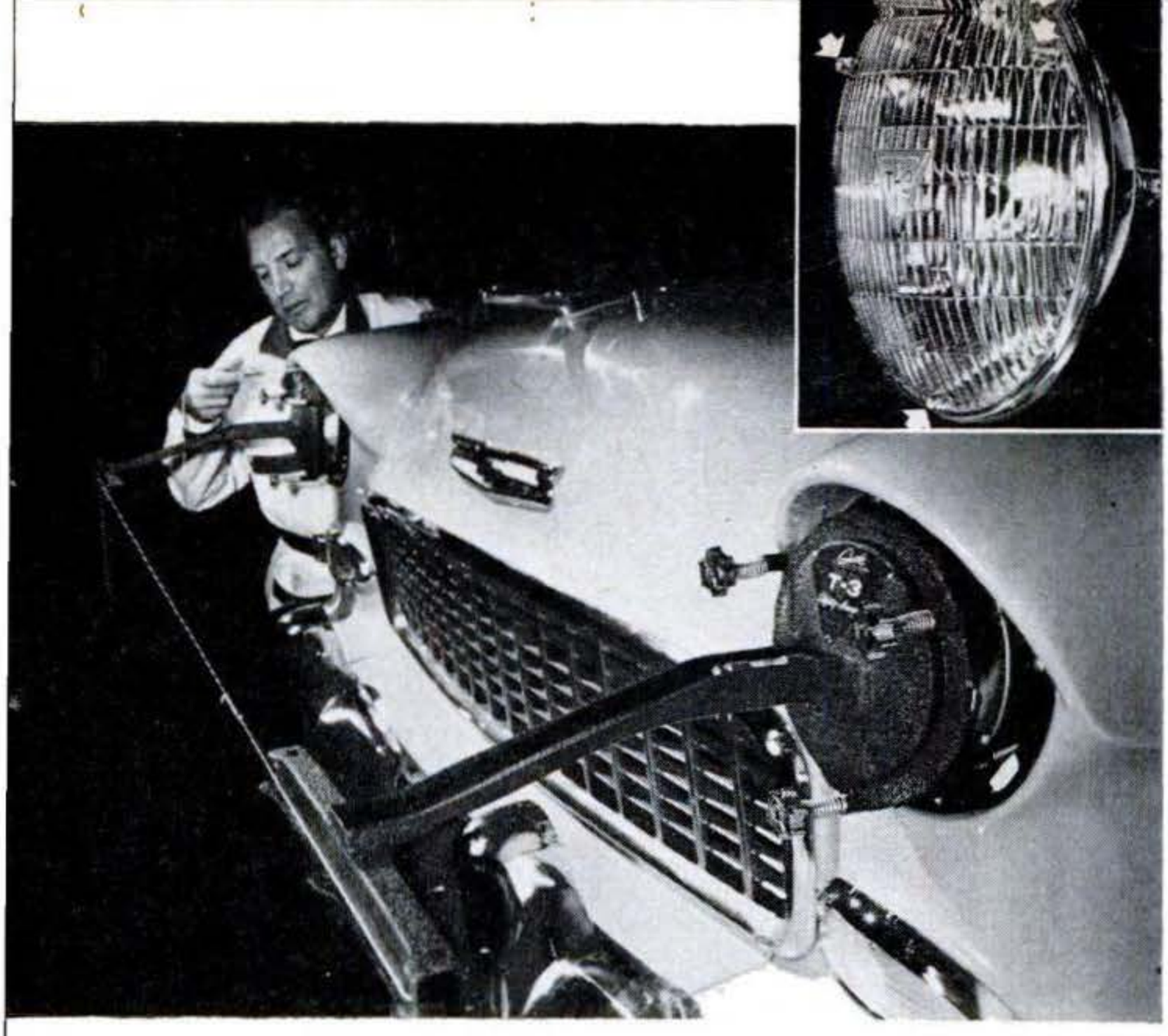
Saw and file an accurate, full-size negative or reverse template of the desired contour from plate brass. Mount it on a taper shank in the tailstock. In the end of a straight tool holder, mill a slot to hold the lug of a dial indicator and tap for a clamp screw.

Set the tool holder parallel to the lathe centerline, with the cutting edge at center height. The template need not be on center; it is most convenient somewhat higher. Using a low spindle speed and power cross feed, manipulate the carriage hand wheel to maintain a constant indicator reading as the tool traverses the stock.

Small deviations on the roughing cuts will not matter, and practice will soon enable you to keep the needle steady on the finishing cuts. In fact, it is surprising how soon the operator gets the feel of this method. Although the indicator follows only half the template, the full template is handy for checking.—*H. J. Gerber, Stillwater, Okla.*

Copyrighted material

New for Your Car

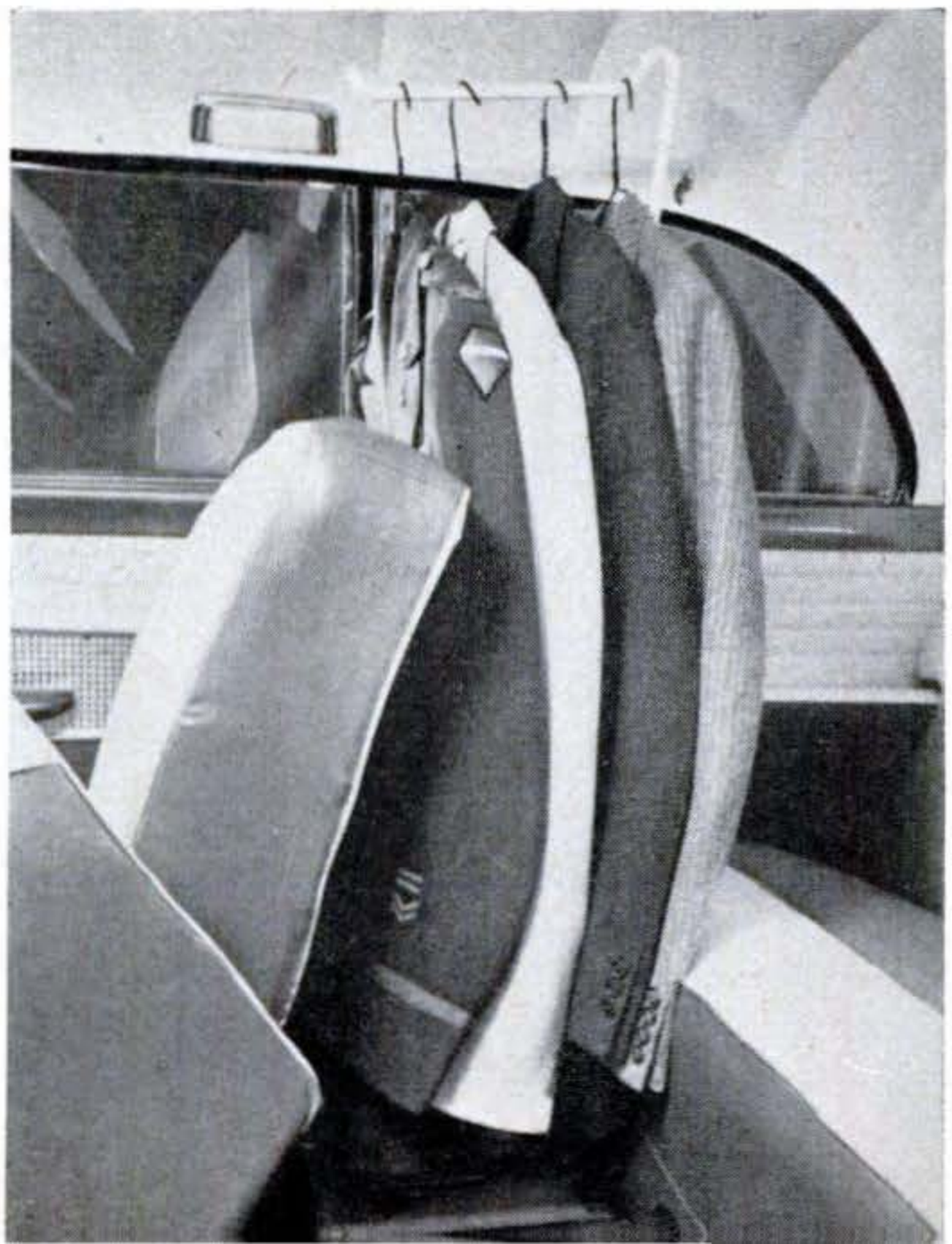


1. Headlights Easier to Aim. A new system of adjusting headlights, developed by General Motors for installing its new improved-visibility lamps, makes it possible to aim them accurately in daylight and without a wall chart. Built-in guide points—three glass knobs cast in each lens (inset)—enable the installer to set the sealed-beam lamps correctly by fitting them to the leveling device shown in use at left.

2. Map Figures Mileage. Locate yourself on this map (right) by sliding an insert until a dot appears at your town. Then you can find the distance to your next stop or for a complete trip. Small windows show the information. A series of 16 sectional maps covers the principal cities.

Further information on these new car products can be obtained from: 1. AC Spark Plug Div., GM, Flint, Mich.; 2. Sayles-Wilson, Inc., 527 W. 39th St., Kansas City, Mo.; 3. Hopkins Co., 430 National Rd., Wheeling, W. Va.; 4. Tyrex Sales Corp., 71-09 Austin St., Forest Hills, N.Y.

3. Clothes Rack Stands in Car. This portable rack, holding up to 10 pressed suits between front and back seats, can be taken into your motel room or cottage without removing the clothes. Between trips, it may be stored in the trunk or used in your home.



4. Fix a Flat Without a Jack. A new tubeless-tire repair kit makes it possible to fix a flat along the road without jacking up the car. You squirt liquid rubber into the puncture with a sealant gun. You then connect the flat and spare with a 16′ hose, permitting excess pressure in the spare to inflate the flat.

ALMANAC
FOR MOTORISTS

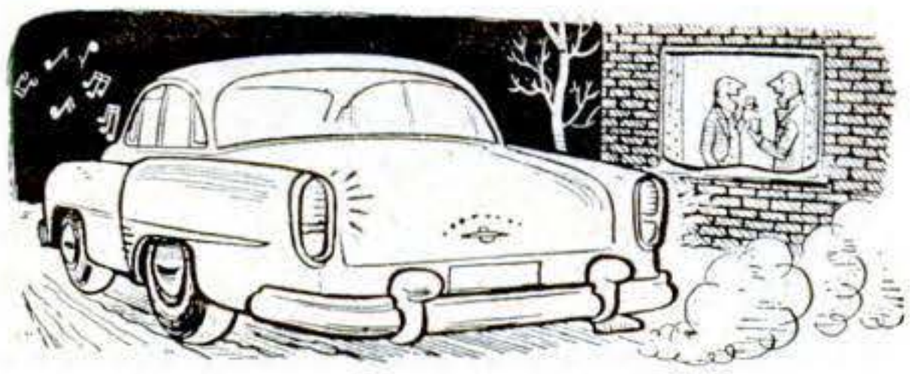
Pithy proverbs, provident counsel and omens and portents of interest to horseless-carriage operators.

▶▶**The rear window** of the car ahead is frequently informative. Beware the driver in front who is one of those head-turning conversationalists, or who is bundling with a gal. He isn't really with you.

▶▶**Good remedy** for a speedometer that has developed ticks and twitches: Disconnect the cable at the instrument, withdraw the inner core, and coat with light oil and graphite.

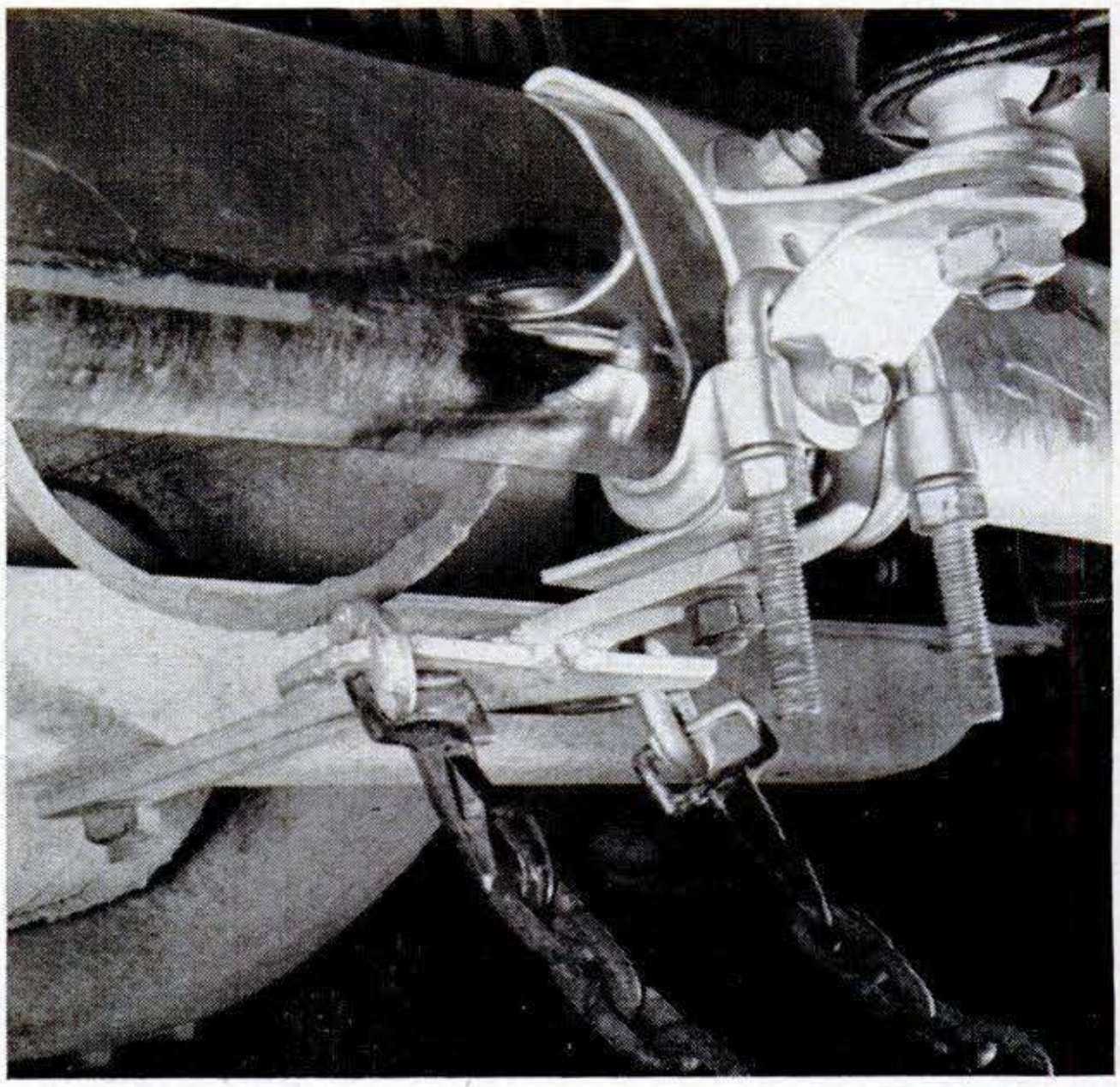
▶▶**One skid preventer** is to keep informed on exactly how slippery constantly changing road surfaces really are. You'll get many clues from the steering wheel and accelerator.

▶▶**It's mean to a car** to make only short trips in bitter weather. Crankcase dilution is worst if an engine never gets hot. So try to make complete warm-ups the general rule.



▶▶**In winter a battery** is like a small bank account. To nurse it along, avoid unnecessary withdrawals—such as a prolonged idle with the radio, heater, and lights spending amperes recklessly.

▶▶**Don't be pleased** by the throaty sound of a muffler that's beginning to rust through. Always hazardous, a worn-out exhaust system is especially so in closed-window weather.

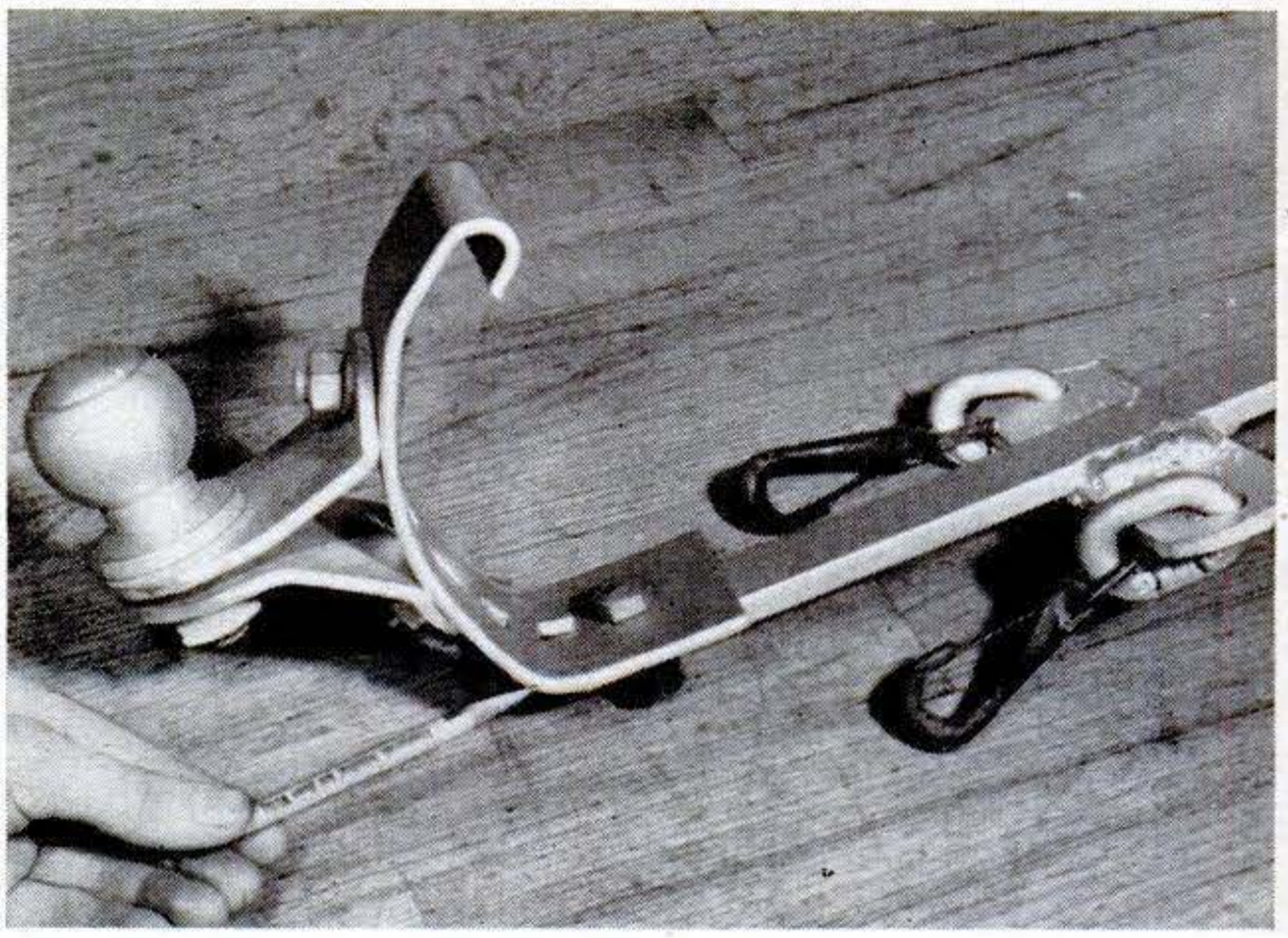


Bumper Hitch Made Solid by Adding Iron Strap

You need not be annoyed by a trailer jerking as you drive with a bumper hitch. Tie the hitch to the car frame as well as to the bumper.

A piece of strap iron run from the bottom of the hitch to the frame eliminated most of the flex in my hookup. A little bending to tailor the hitch to the bumper may also help.

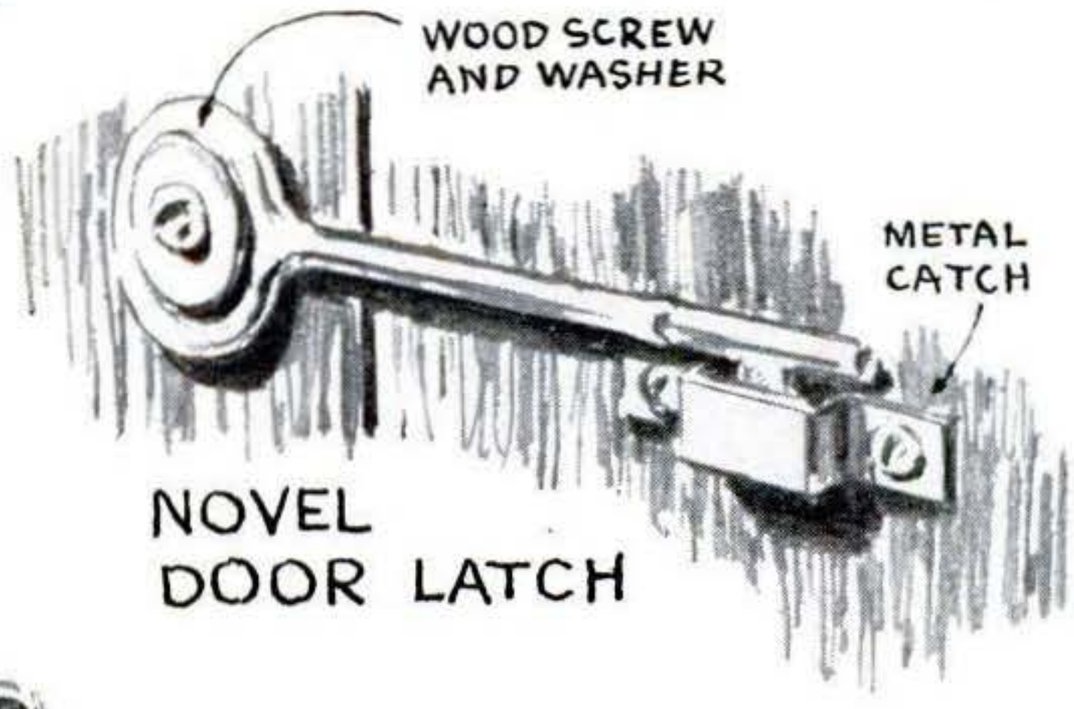
Weld a crosspiece to the longitudinal strap iron, add a pair of harness clips, and you have a fast way to hook up the safety chain.—*Jim Miller, Moline, Ill.*



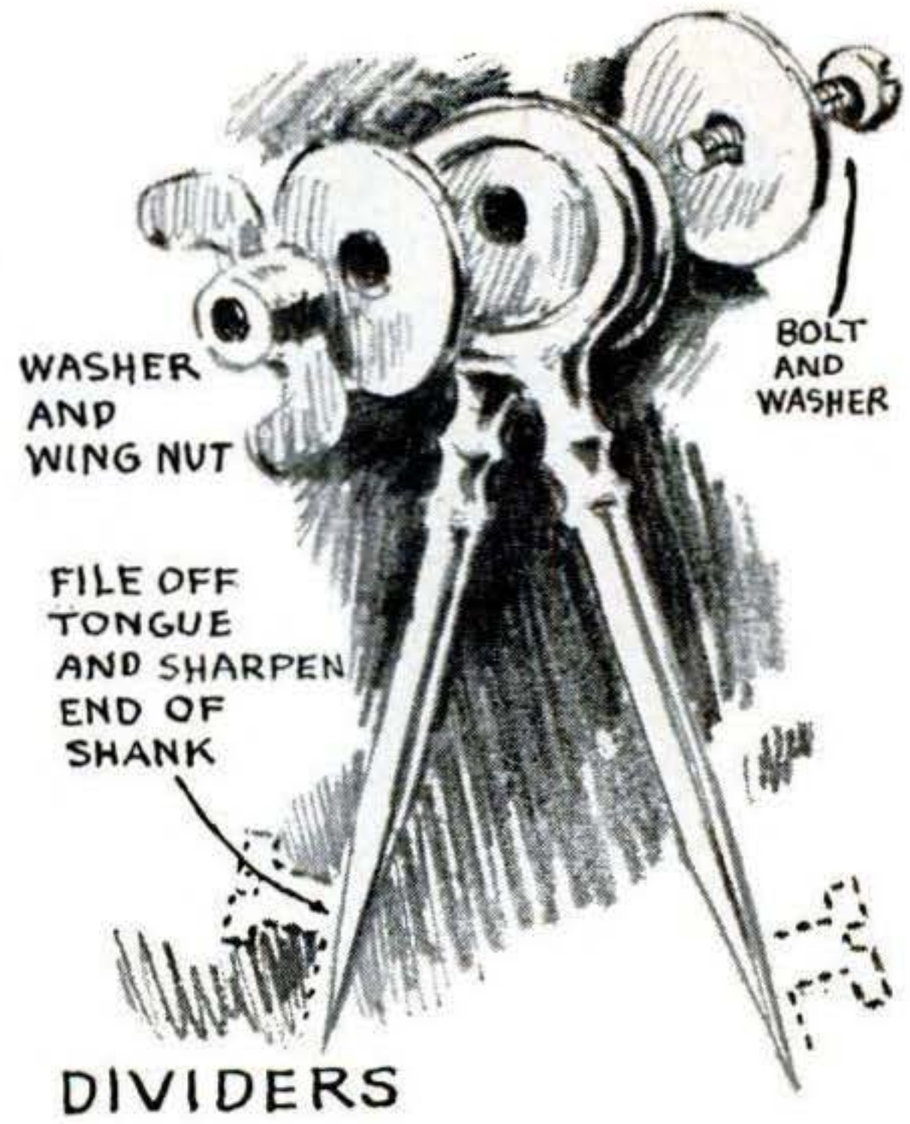
BEND THE BOTTOM of the hitch at right angles to the bumper and bolt the strap iron to it.

Copyrighted material

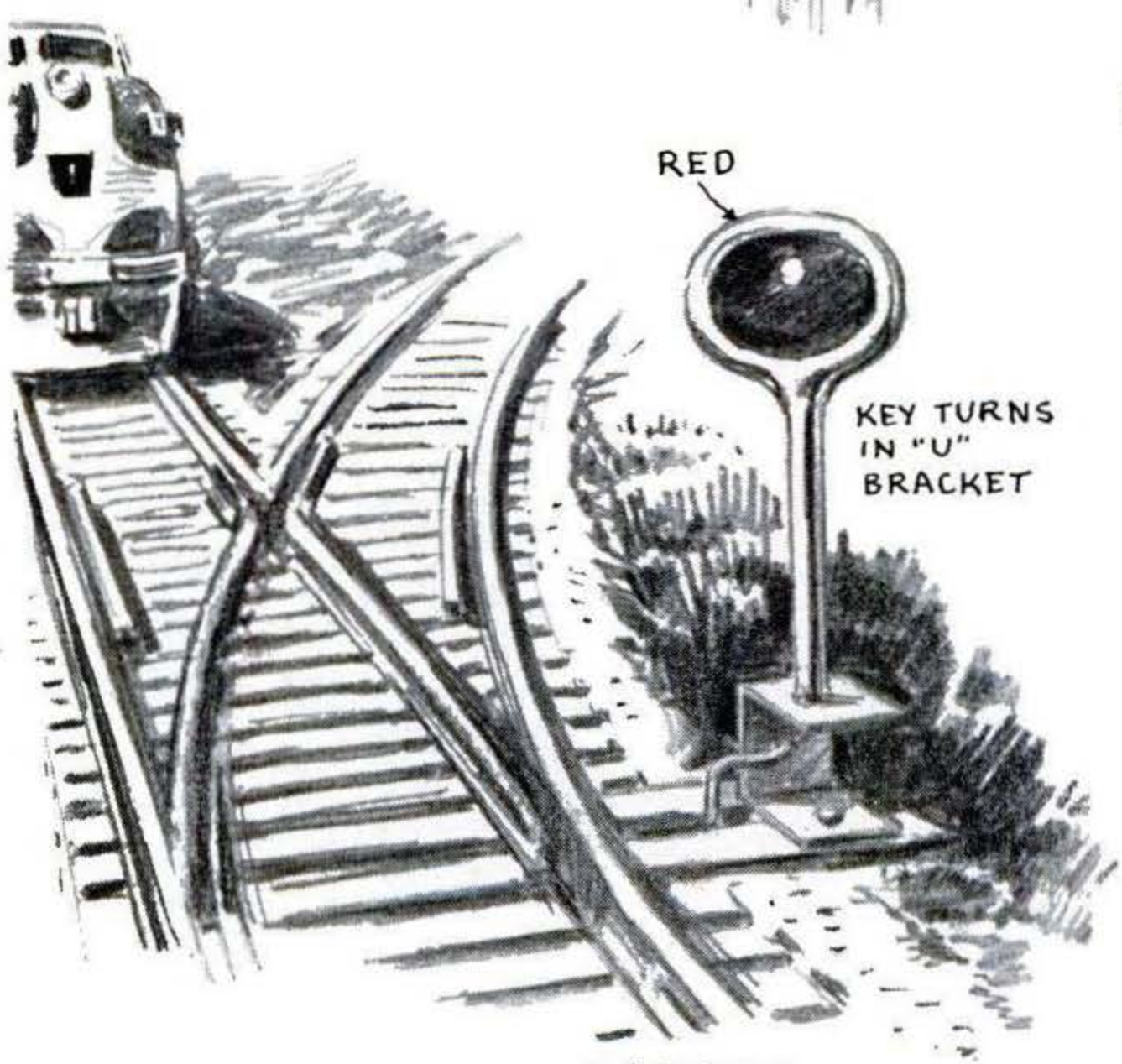
6 USES FOR Old Keys



NOVEL DOOR LATCH

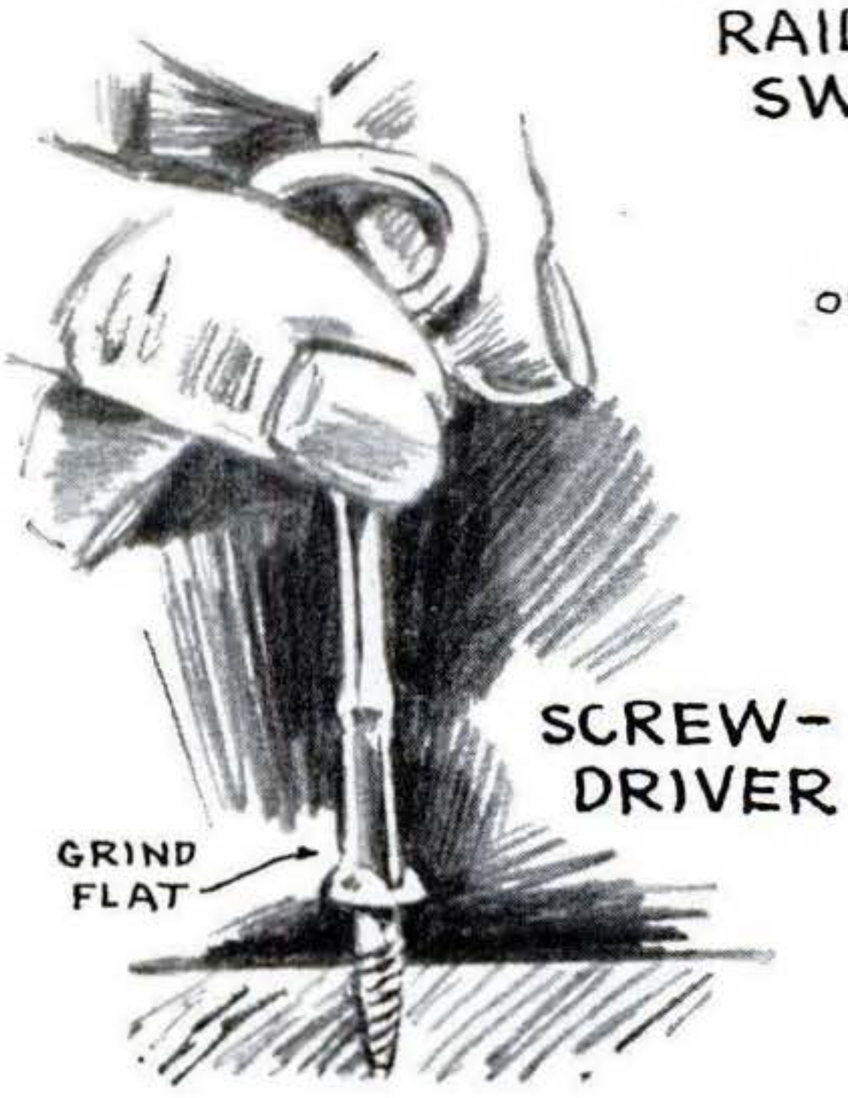


DIVIDERS

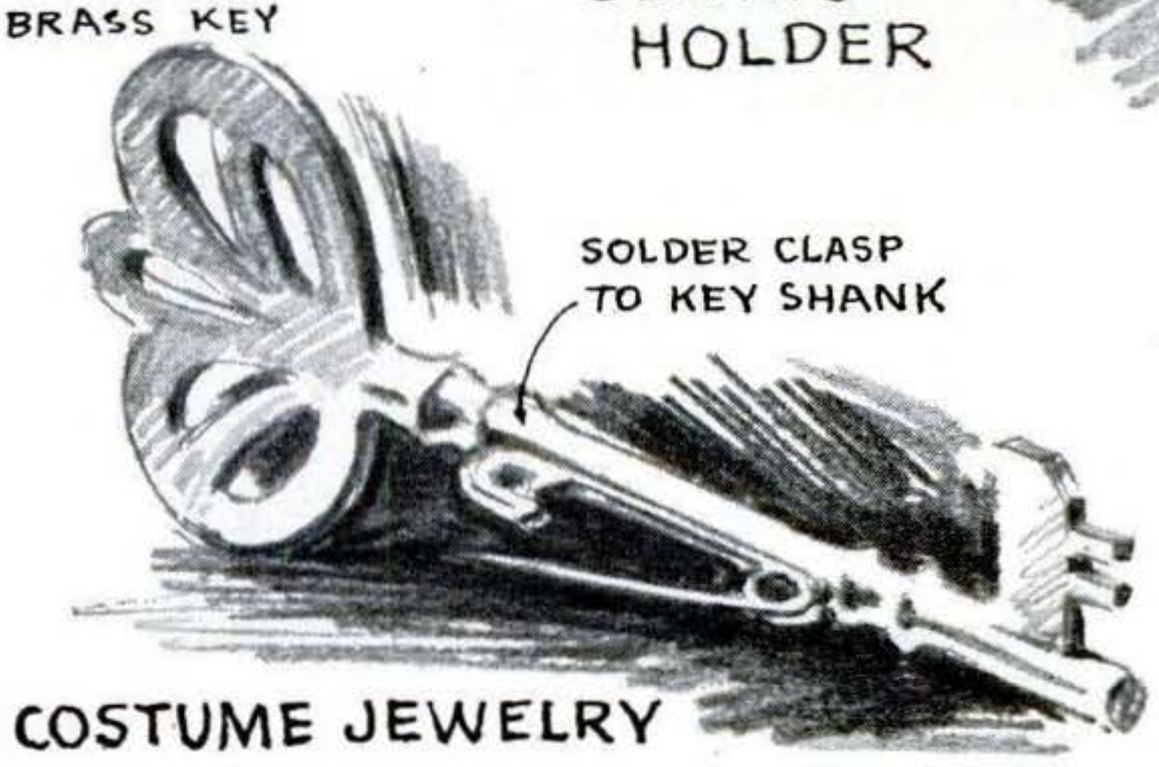


MODEL RAILROAD SWITCH STAND

WORK GLOVES HOLDER



SCREW-DRIVER



COSTUME JEWELRY

Copyrighted material

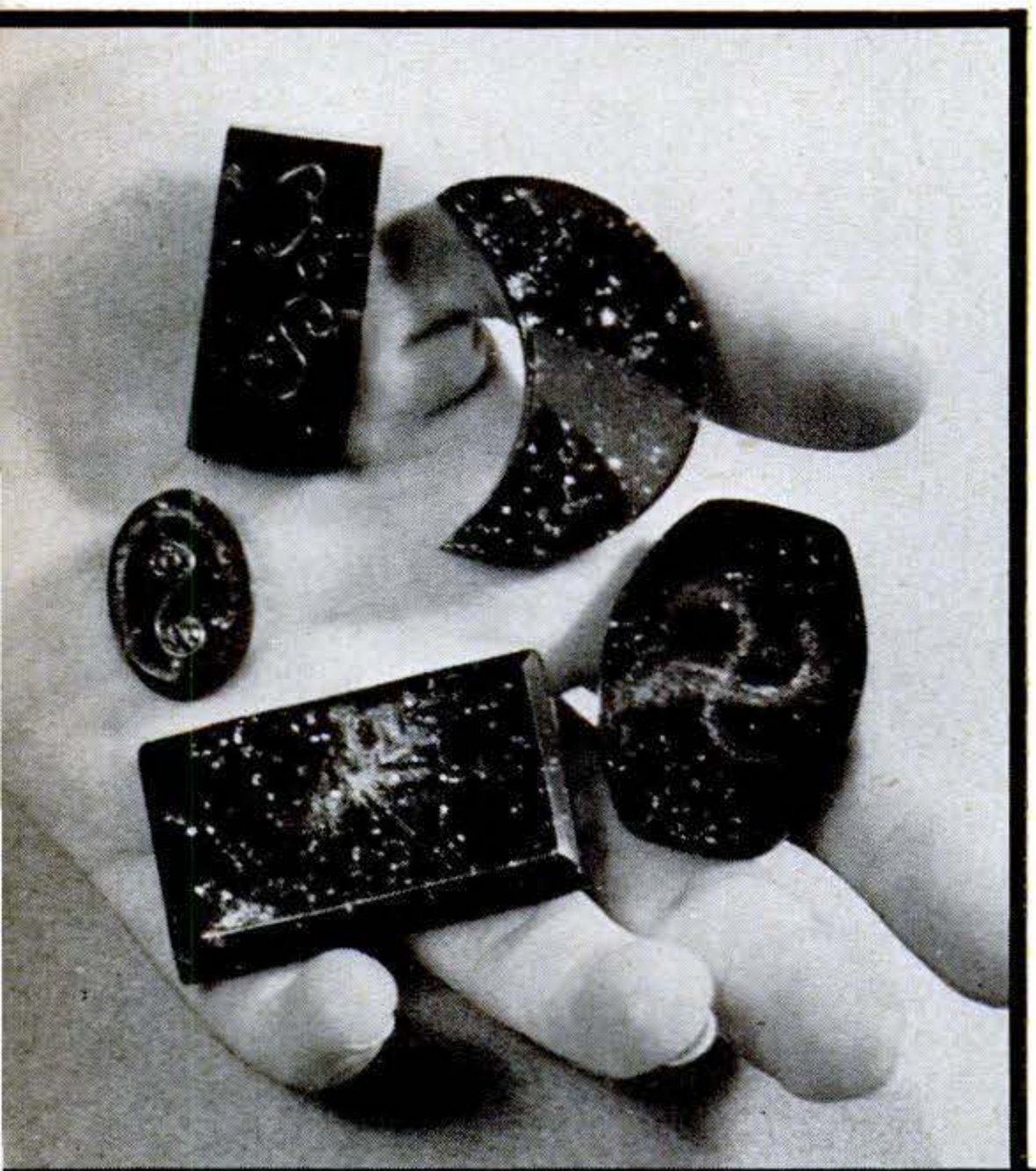
Four Gifts You Can Make Quickly

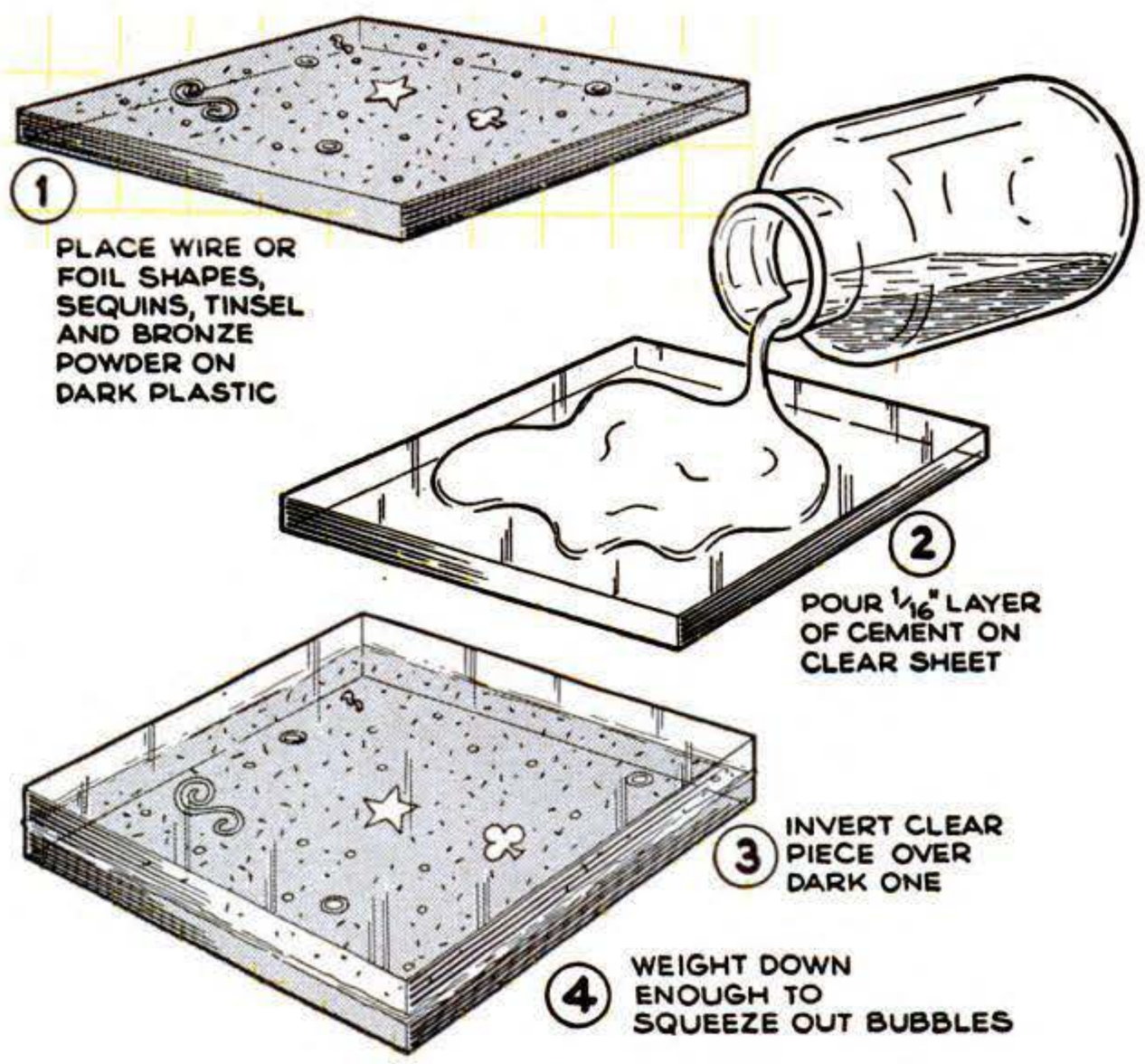
1 Plastic Jewelry. Color and sparkle can be sealed into plastic, which may be cut into attractive one-of-a-kind jewelry pieces. Pour ethylene dichloride into a bottle that you can cap. Dissolve enough Plexiglas sawdust in it to make a syrupy cement. Cut a piece of black or colored Plexiglas and one of clear about 3″ square.

On the opaque piece, arrange foil or thin wire shapes, pearl flakes or sequins, and dust with bronze powders or glitter (both come in colors). Cover the clear sheet with cement, invert it quickly over the other and weight it down lightly.

After 24 hours, mark a circle, oval or other design outline with a china pencil. Use a jeweler's saw to cut out the form that you've drawn on the plastic "sandwich." Smooth the edges with wet silicon-carbide paper, and polish by buffing lightly or by brushing on pure solvent.

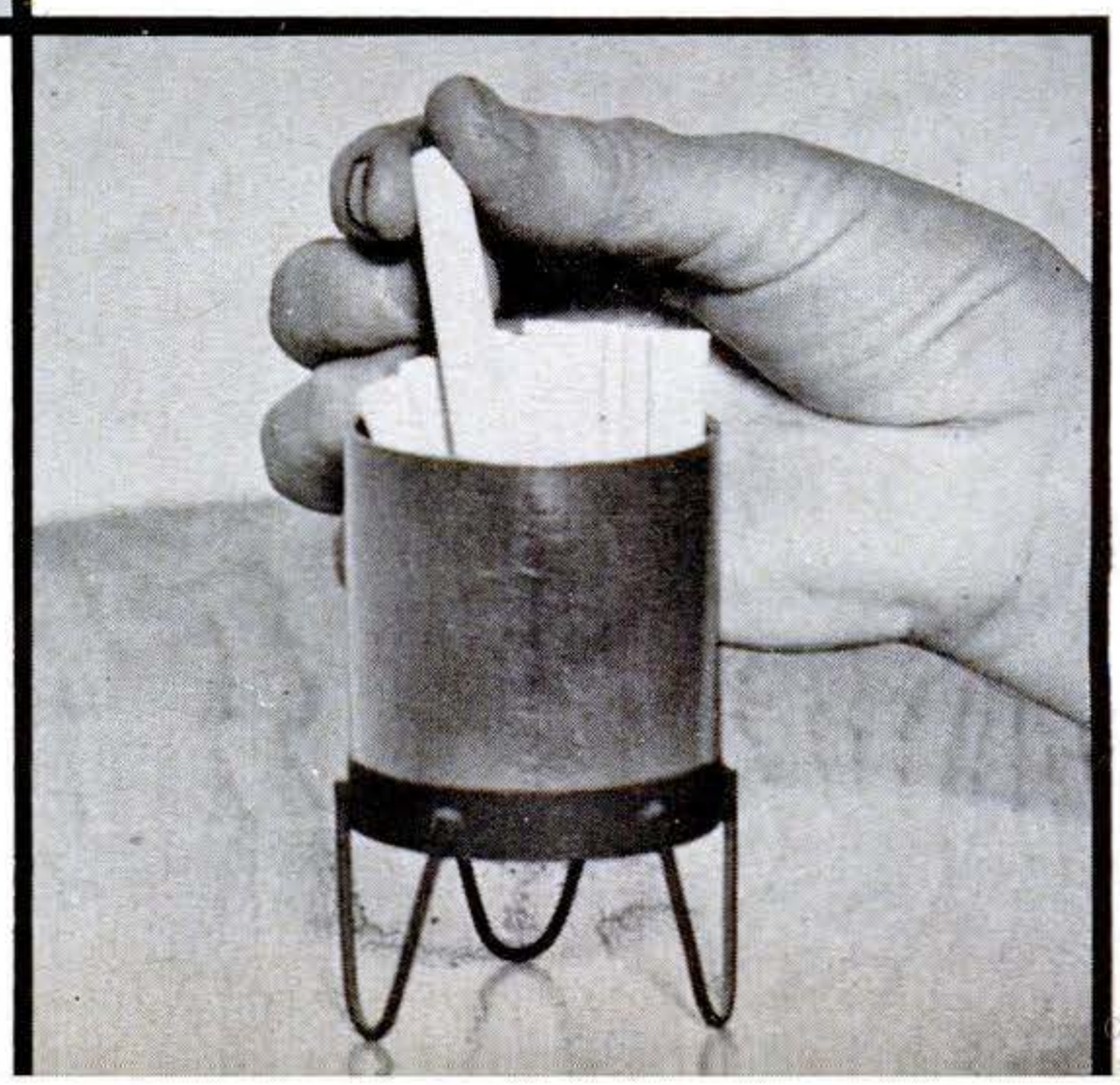
Cement fittings to the back, or sink small screws or eyes by heating them into the plastic with a soldering iron.



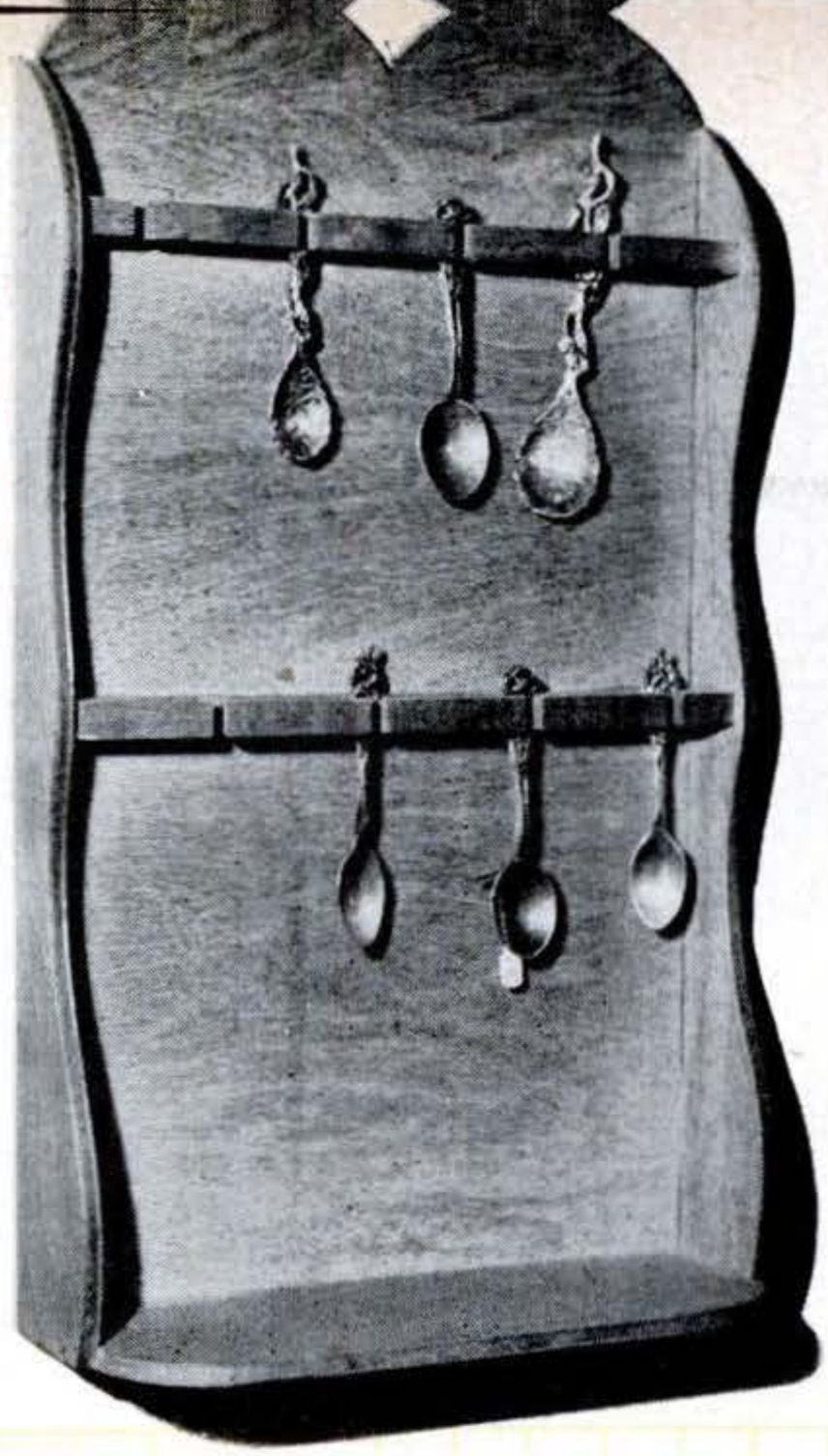


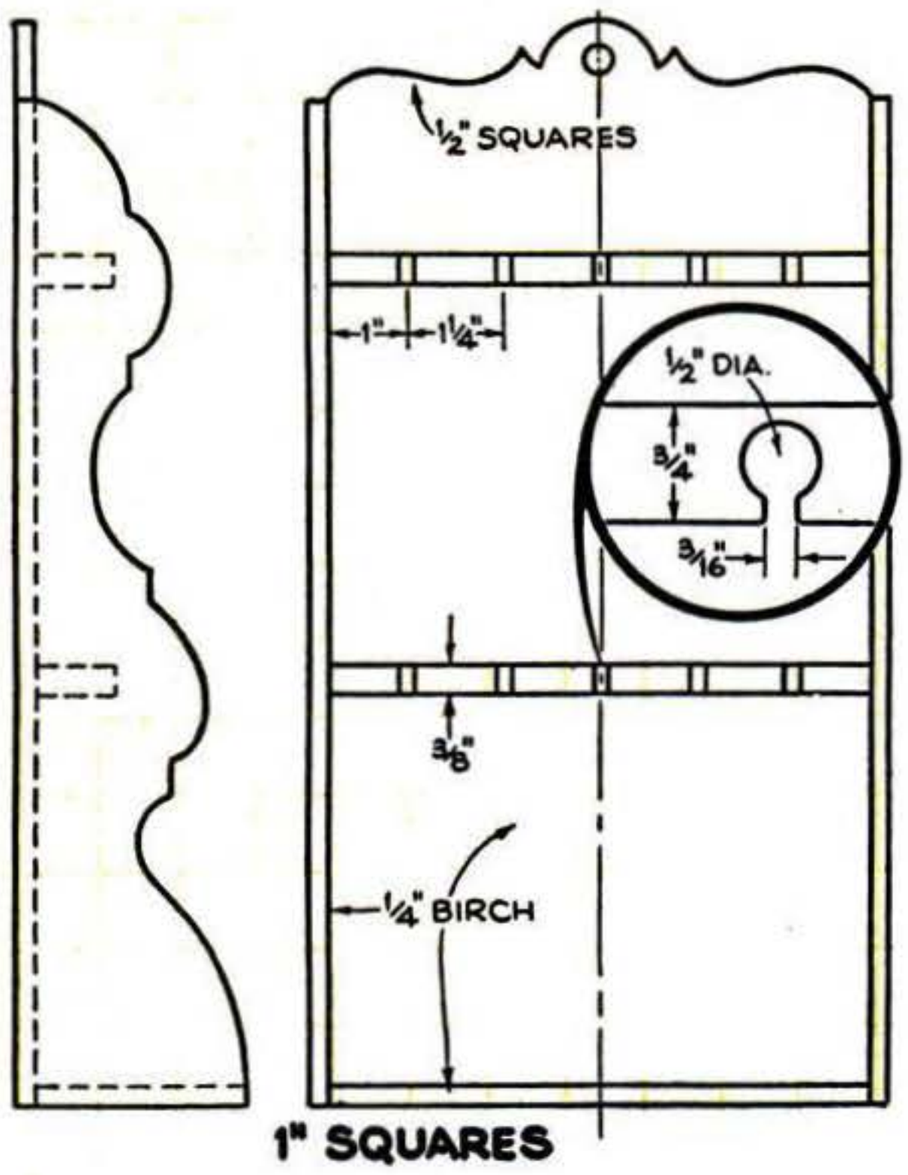
2 Cigarette Box. Cut a 2¼″ length from a piece of 2″ copper vent pipe. Solder a disk of light-gauge copper in one end. Bend three U-shaped legs from copper or brass wire and solder them to the sides near the bottom.

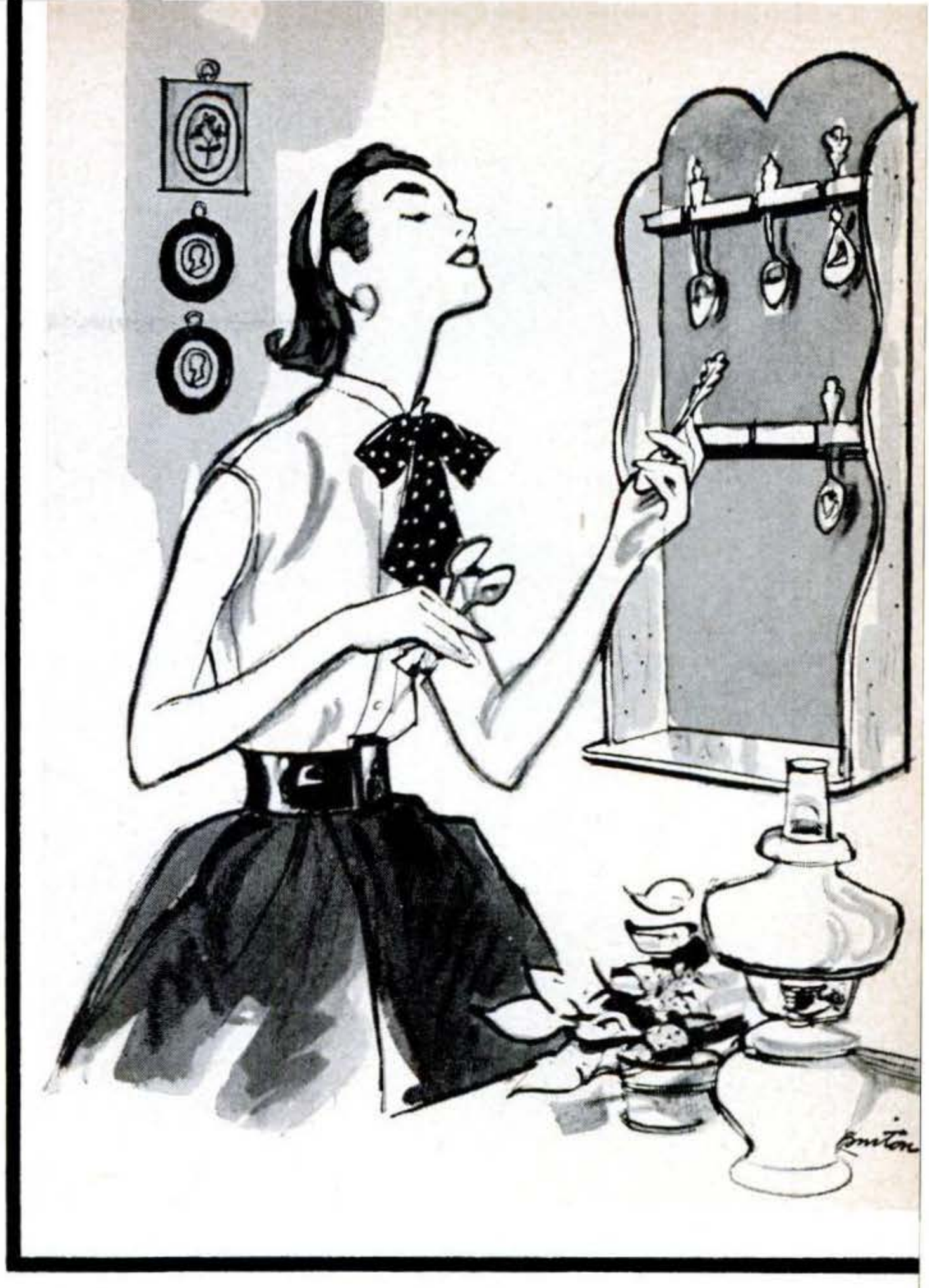
Polish the cylindrical box and legs with steel wool and apply a coat of clear lacquer or, for a contrasting effect, mask the upper part of the box and paint the lower area flat black.



Copyrighted material

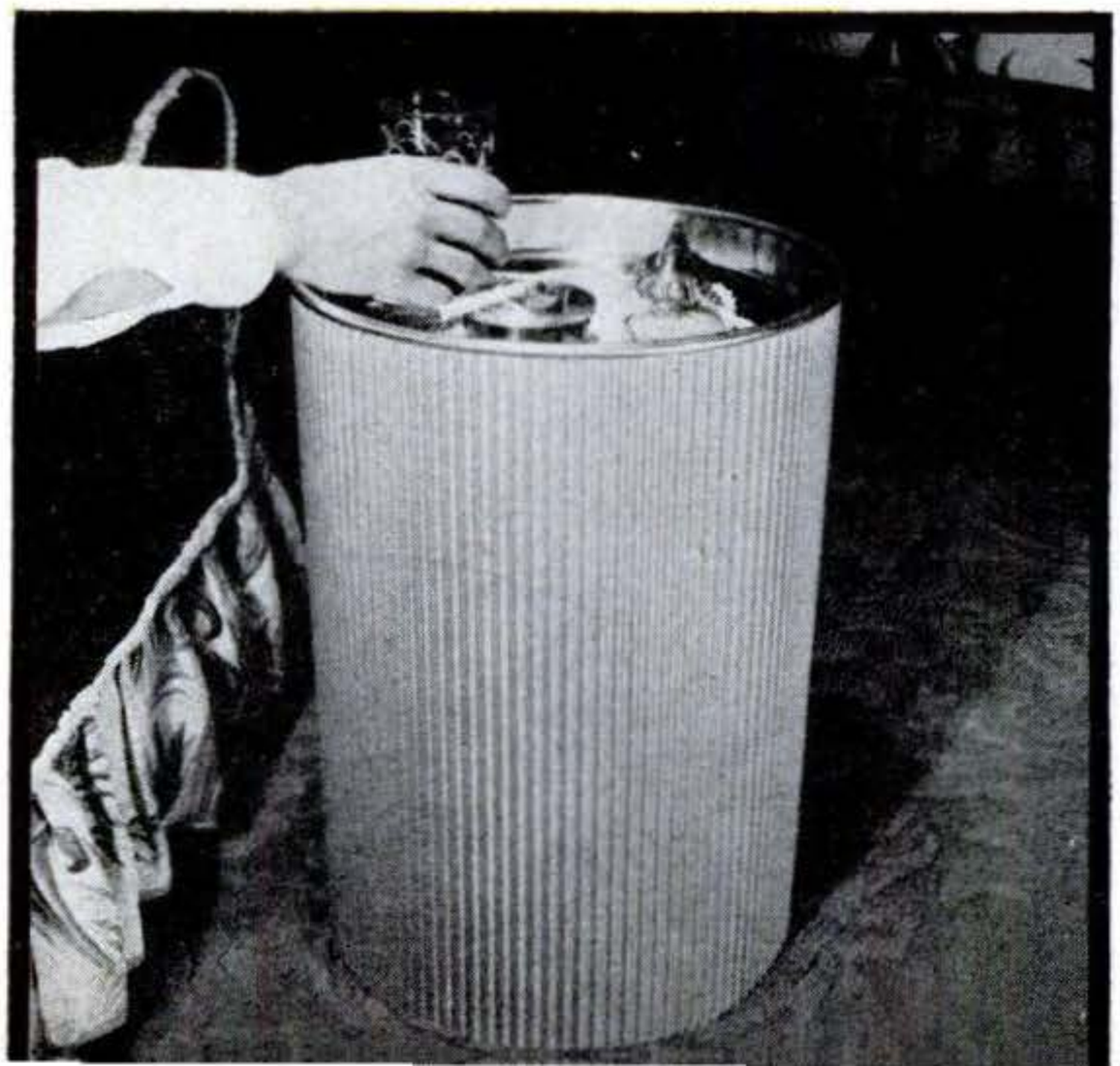






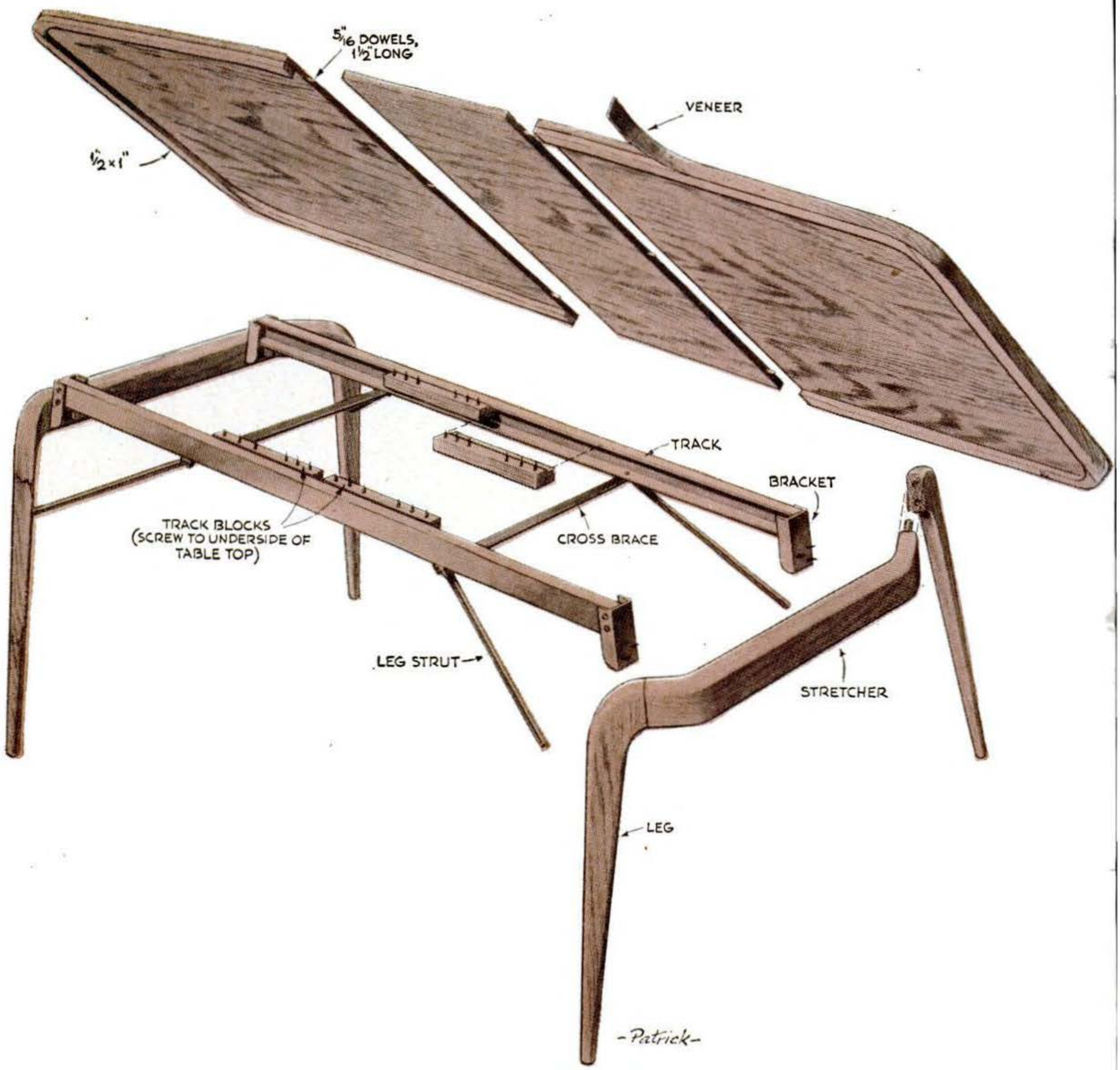
3 Spoon Rack in Birch. For the early American style in the photo, lay out identical sides with a simple, wavy line. Draw the top of the back with a compass. For a more formal design, transfer the patterns in the drawing.

Use ⅜" stock for the spoon holders. Bore ½" holes and cut 3/16" slots to meet them. Assemble with glue and brads. Finish with wax, and apply screw eyes to the back for hanging.



4 Chairside Table. Smart as it looks, this handy piece is made of cardboard and a baking tin. The tin used is 12" in diameter and 1½" deep. Roll an 18"-wide strip of corrugated cardboard into a cylinder around the tray and under its lip. Two overlapping turns make a surprisingly strong base. Fasten the end with glue and a few staples. Paint the cardboard or wrap it with rings of colored tape.

Copyrighted material



EXPANDING FOR COMPANY, this sleek dining table takes two leaves that provide comfortable room for 10 people. When extra seating space is not needed, you store the leaves in the convenient pocket formed by the aluminum extension tracks (left) and close the top. The top slides freely on the tracks, which are screwed to the curved legs to form a rigid base unit. You don't have to move the legs to open or close the top.

Copyrighted material

How to build a good dining table

You'll be proud to show off this fine table, designed for PSM by a master craftsman.

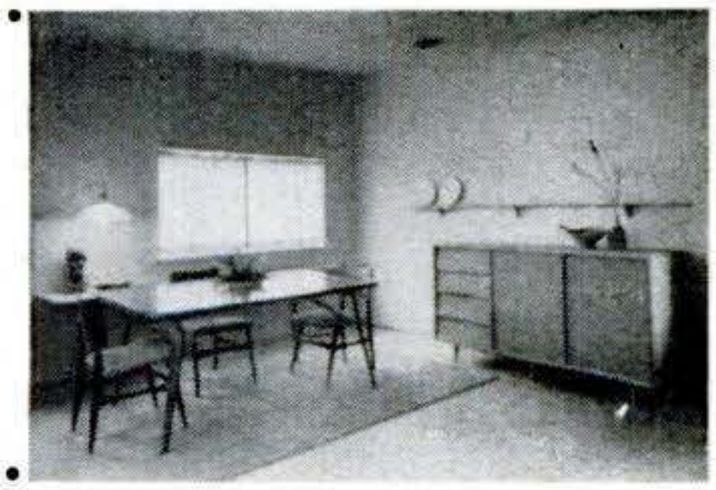
By Frank Dorr

HERE is a table for the night the boss and his wife come to dinner. Mrs. Boss will be impressed by its beauty, for this stunning job exudes hang-the-expense refinement.

Mr. Boss will be impressed when you let him peek underneath at the aluminum-channel extension tracks. If he says admiringly, "Never saw anything like that before!" he's right. The aluminum structure is unique. It's another neat dodge that custom cabinetmaker Martin Stan Buchner has devised to help amateur craftsmen build superior furniture.

The table, designed and built by Buchner especially for POPULAR SCIENCE MONTHLY, offers plenty of elbow room

The smart dining table described here is the work of cabinetmaker Martin Stan Buchner, winner of many design awards and custom builder of fine furniture (The Buchner Co., Whippany, N. J.). At right you see how your table will look with its matching chairs and buffet.



Copyrighted material

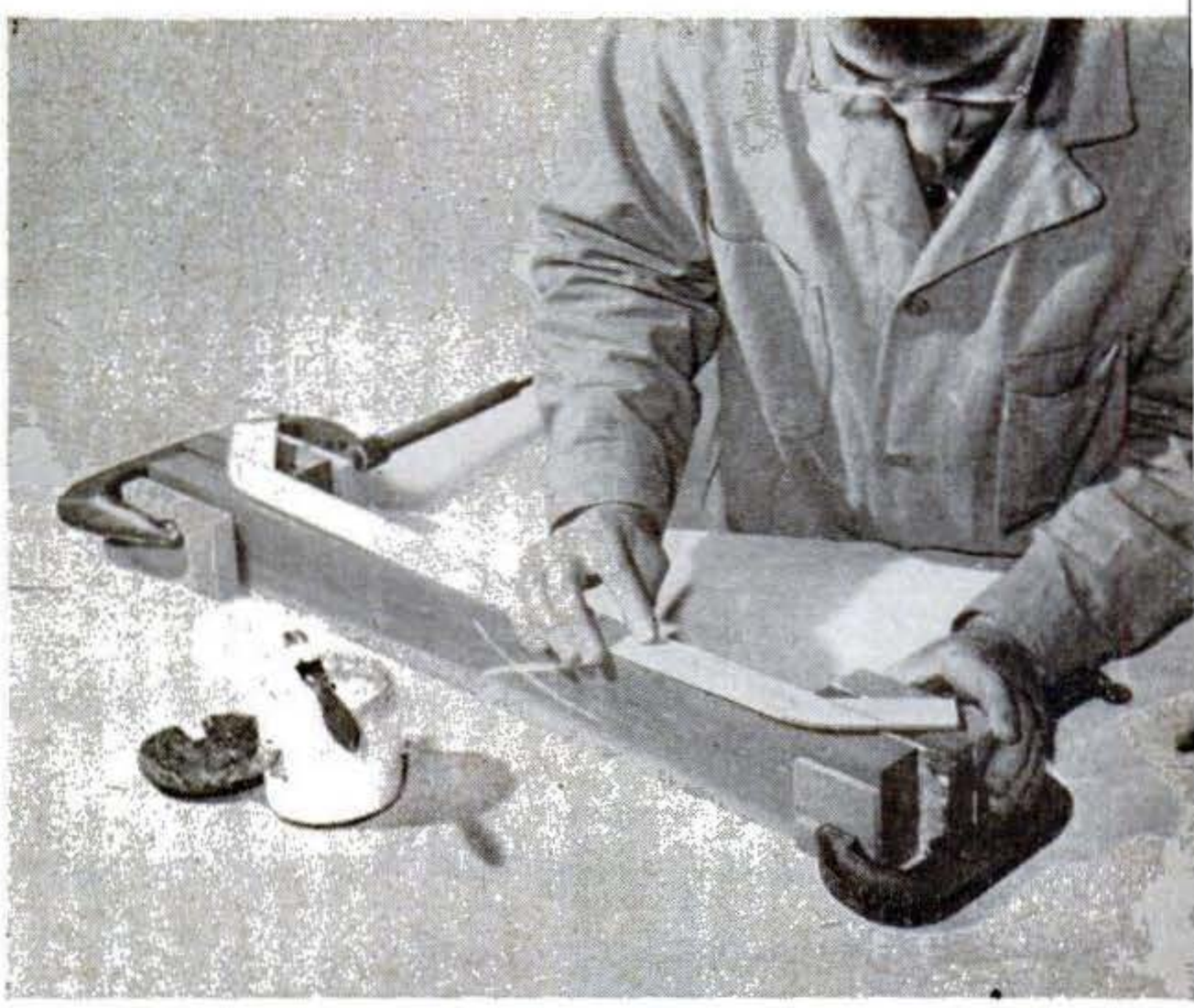
for six people when closed, 10 when extended. It matches the side chairs described last month (p. 178) and a server-buffet that will be detailed in the January issue.

The aluminum frame holds the table up. The legs and stretchers are rigidly attached to it (not to the top). This makes a structure sturdy for the ages, as practical for everyday meals and children's homework as it is for company dining. It eliminates cumbersome side aprons and provides storage space for the extension leaves.

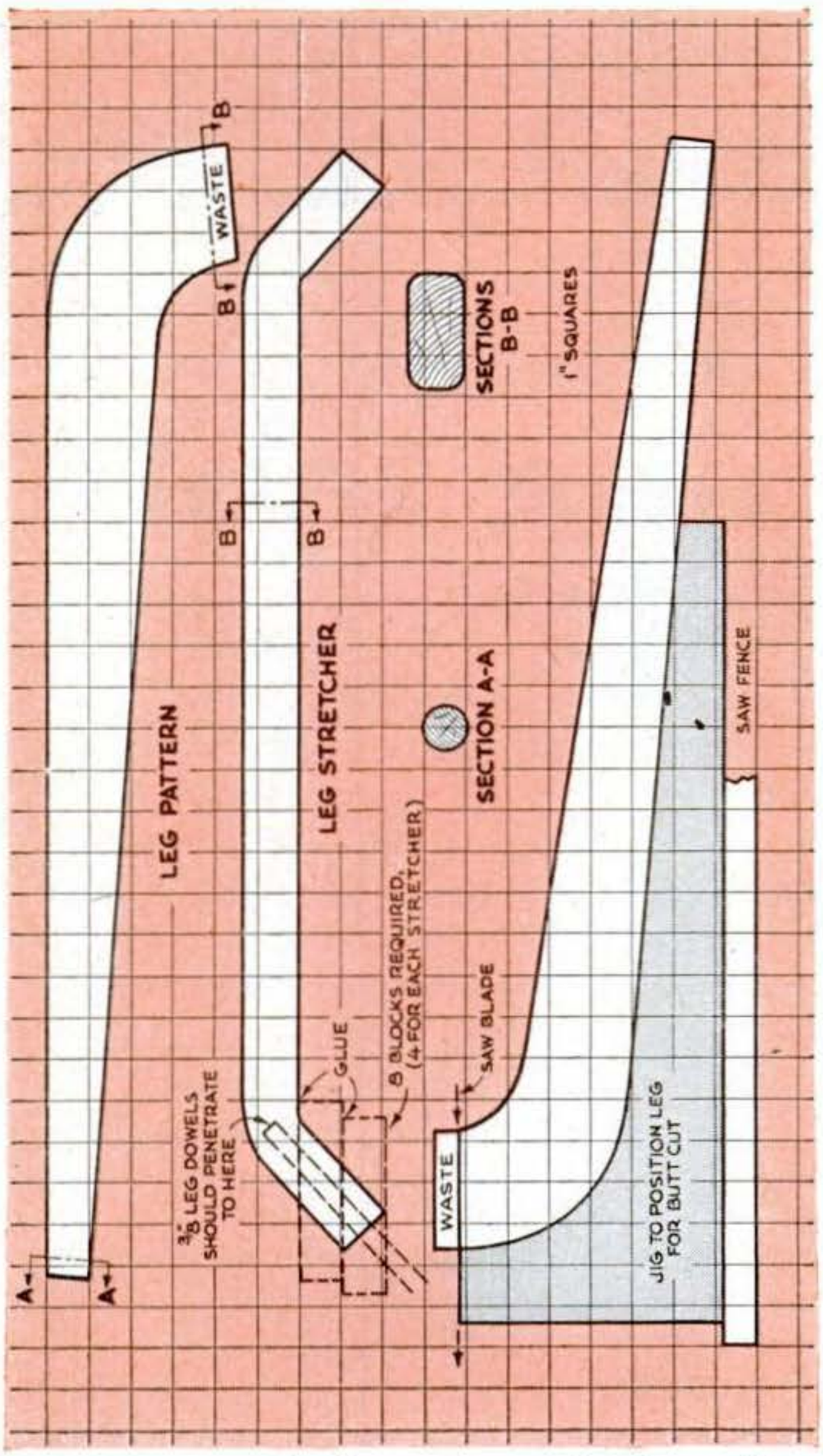
The aluminum stock you make it from is standard stuff, ⅛″-by-1″-by-2″ channel. Most big building-supply and hardware firms handle it.

The top. You see the touch of the

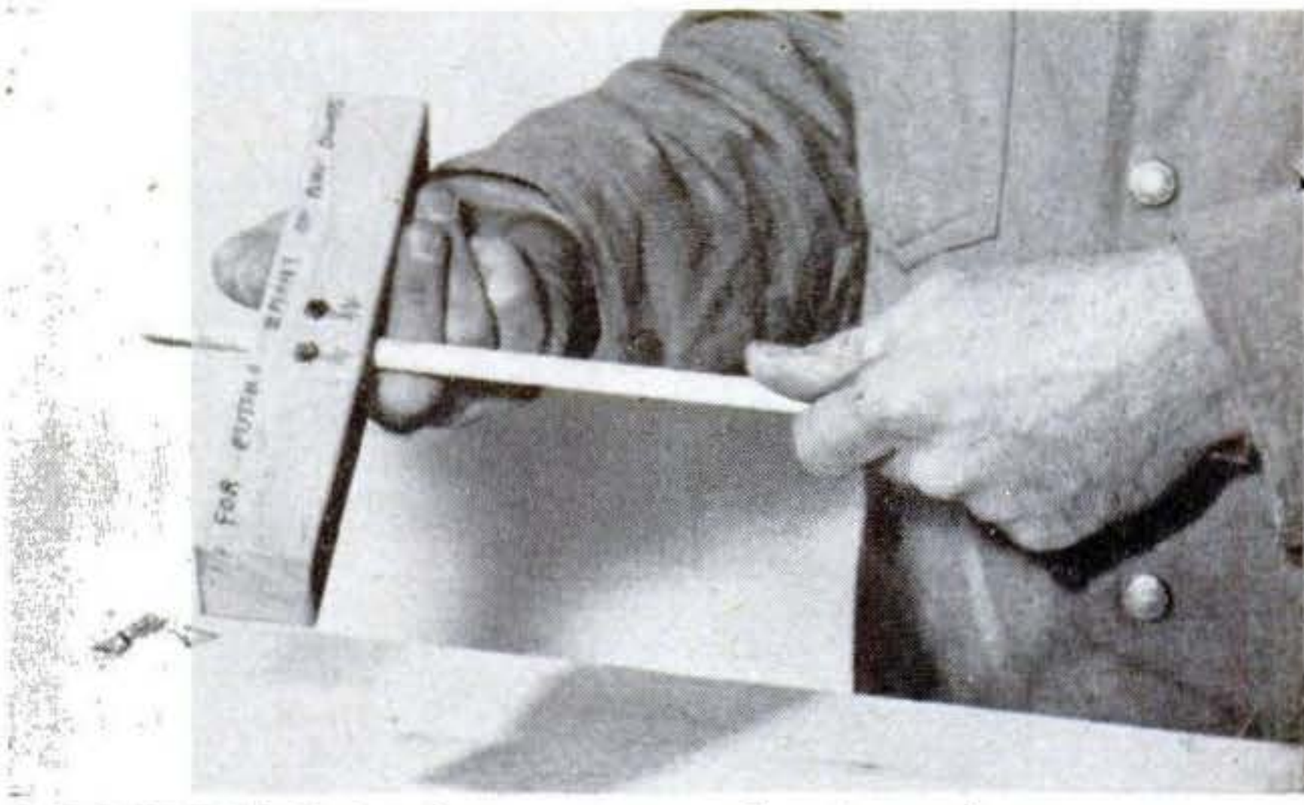
LEGS Angle for butt joint between leg and stretcher is cut after the leg has been bandsawed to template contour. Hardwood stock is 4″ wide, 1⅜″ thick. The jig shown in the pattern drawing holds leg in photo above.



STRETCHERS Glued-on blocks provide stock for curved ends. Wood for the blocks and main piece is 1⅜″ thick, 2⅞″ wide. When glue sets, bandsaw the ends.

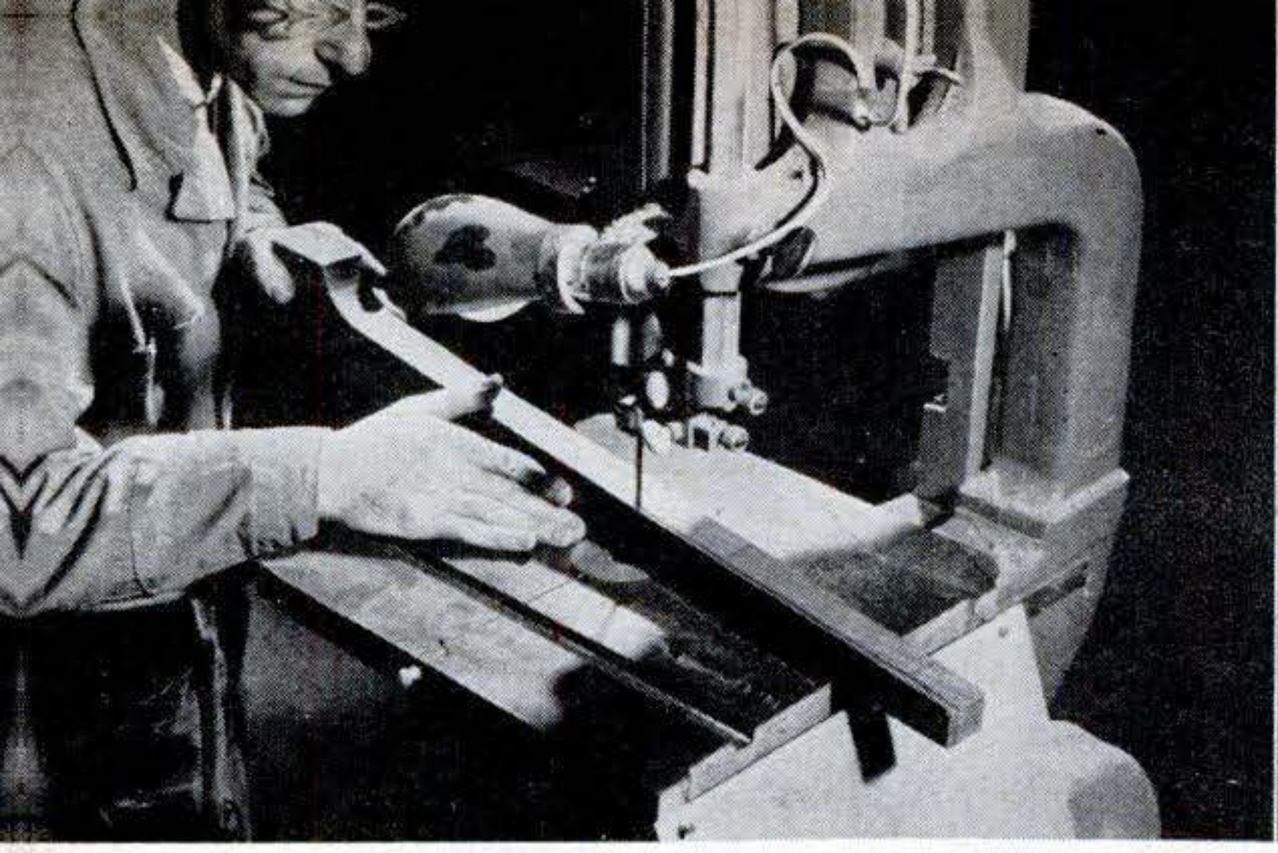


CUT TEMPLATES for leg and stretcher by scaling up these patterns on cardboard or thin plywood. Pattern at right shows jig you will need to make an accurate butt cut at top of the leg.

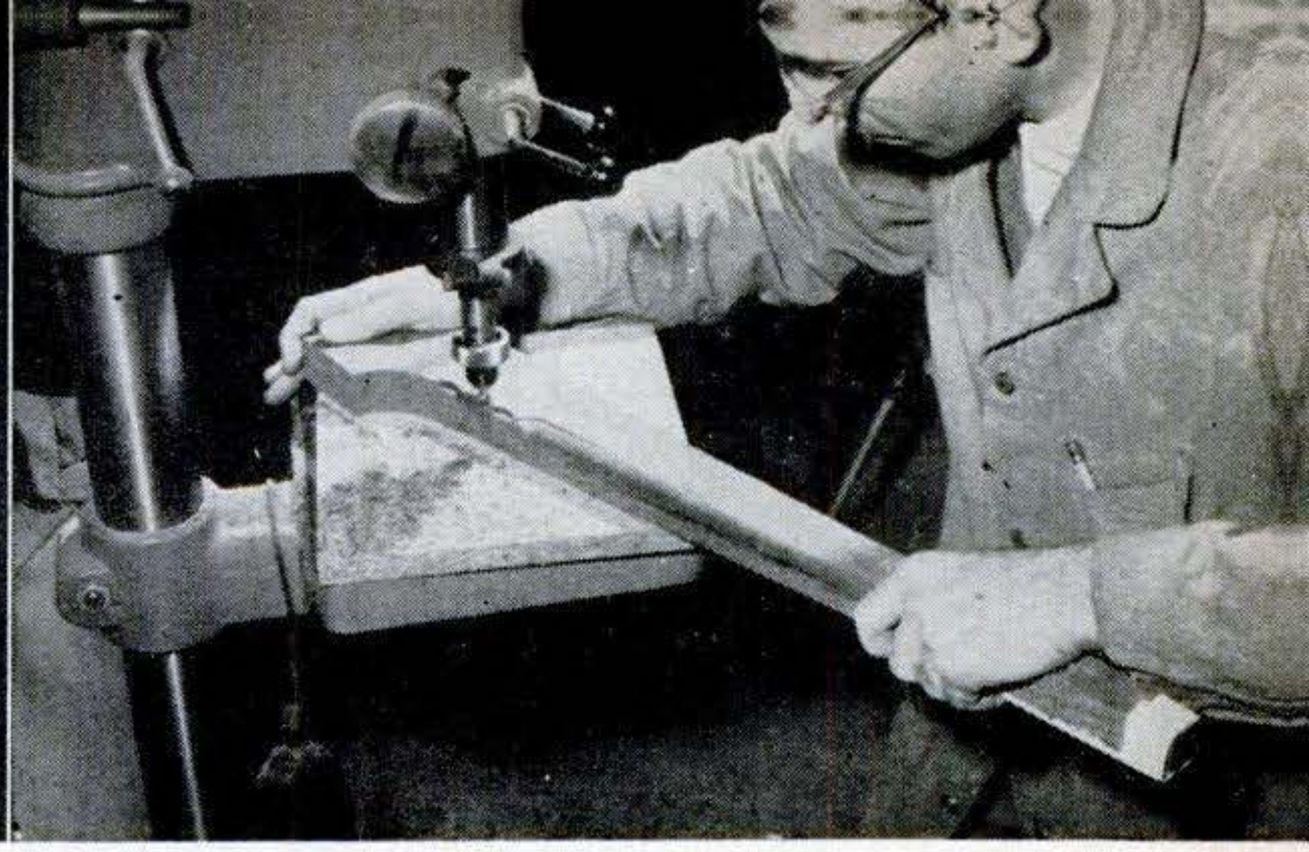


ASSEMBLY Make your own furniture dowels (commercial ones aren't long enough). End of screw in jig hole cuts glue-holding spiral as you twist dowel through.

Copyrighted material

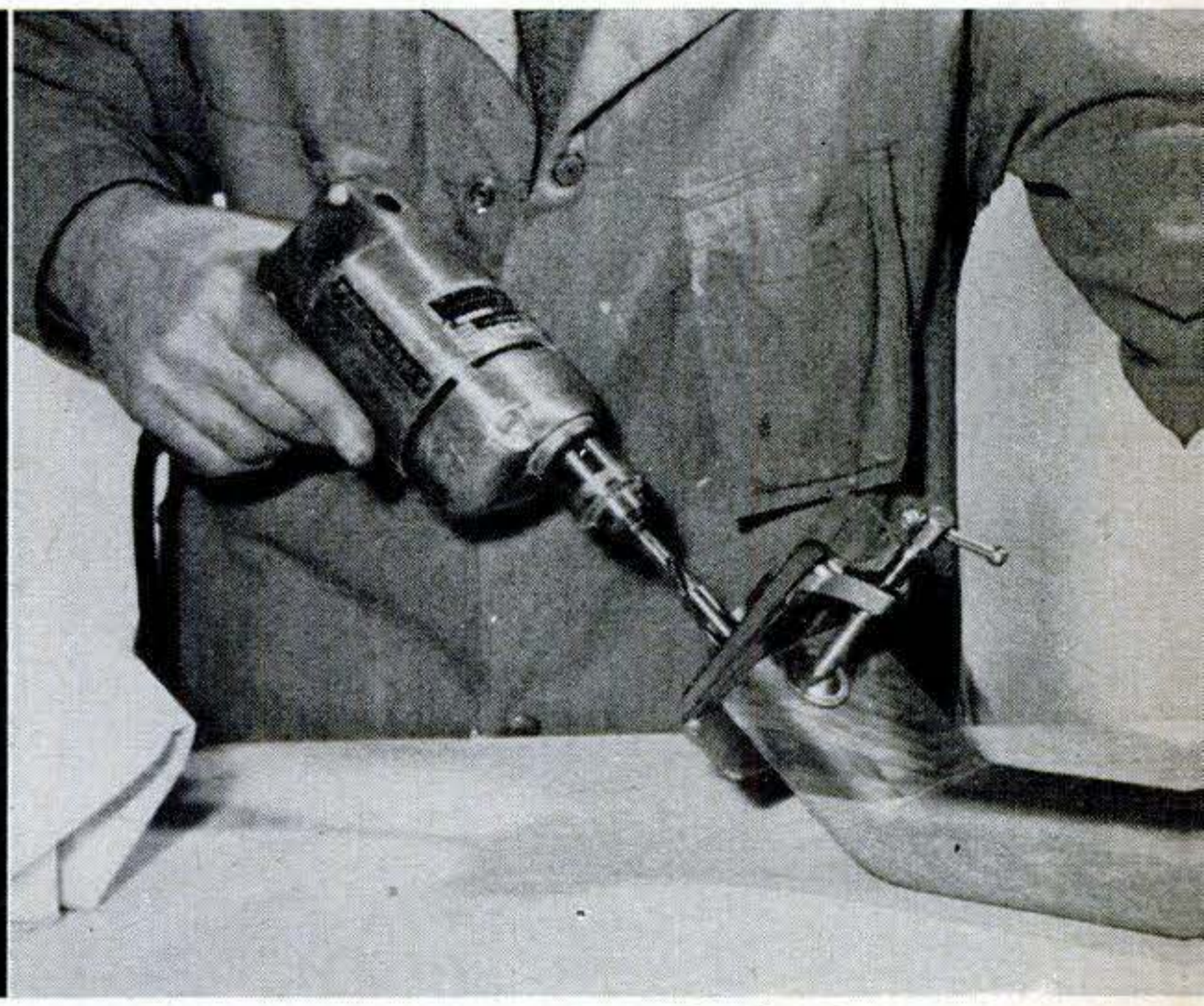


TO TAPER THE LEG, mark bottom end with centered 1″ square. Take 3/16″ off at the start on both sides, tapering the cut to leave full thickness near the upper end. Smooth with plane. Save scrap to level the leg for shaping.

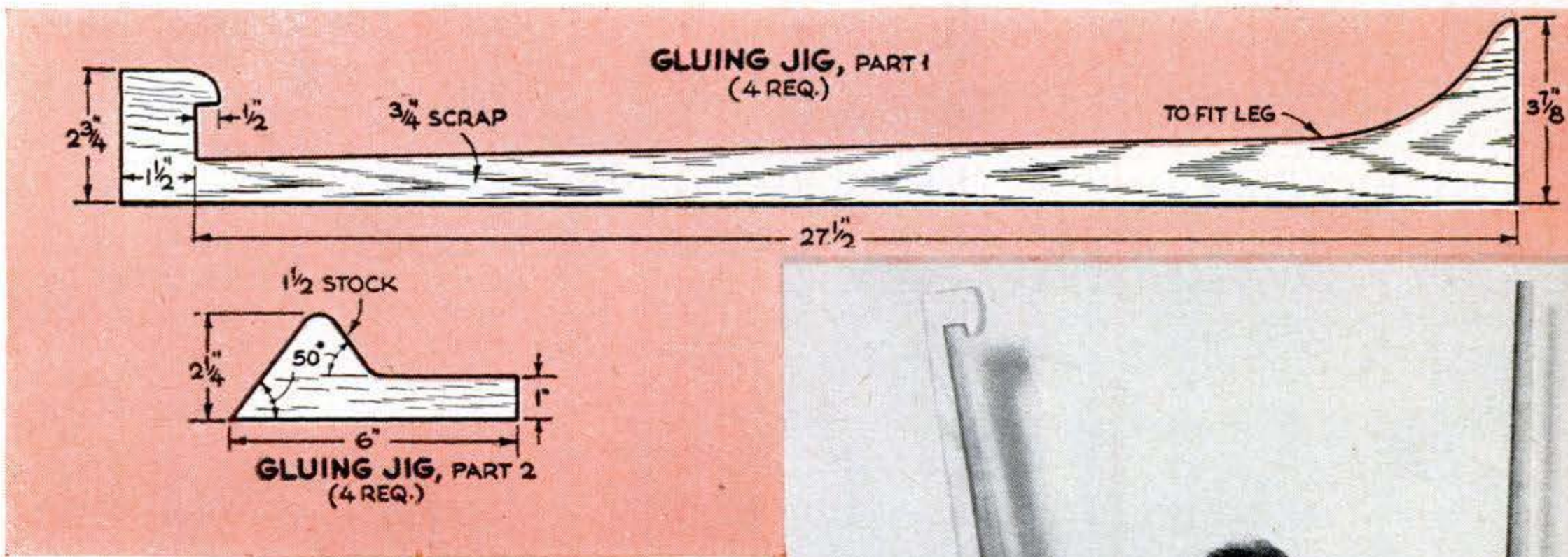


SHAPE LEG (and later stretcher) with ½″ rounding-off cutter. To avoid splitting, stop short of ends and finish them after assembly. Taped-on wedges, which level surface of leg, are removed for hand-finishing of bottom end.

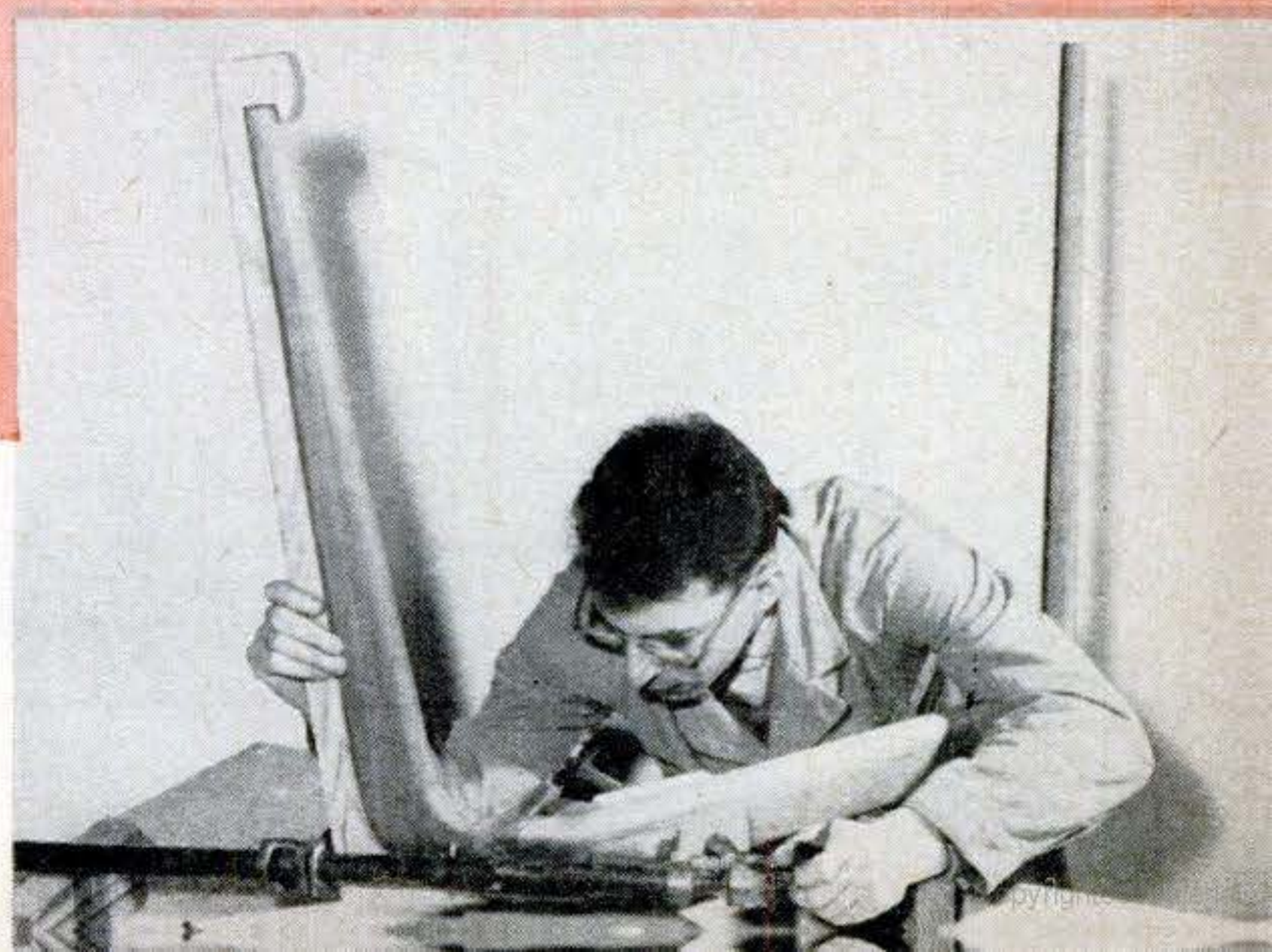
STRETCHER ENDS ARE CUT at 90° for joint with legs. Brace stretcher against 42½° angle block clamped to miter gauge. Same block braces the stretcher for indexing the dowel holes.

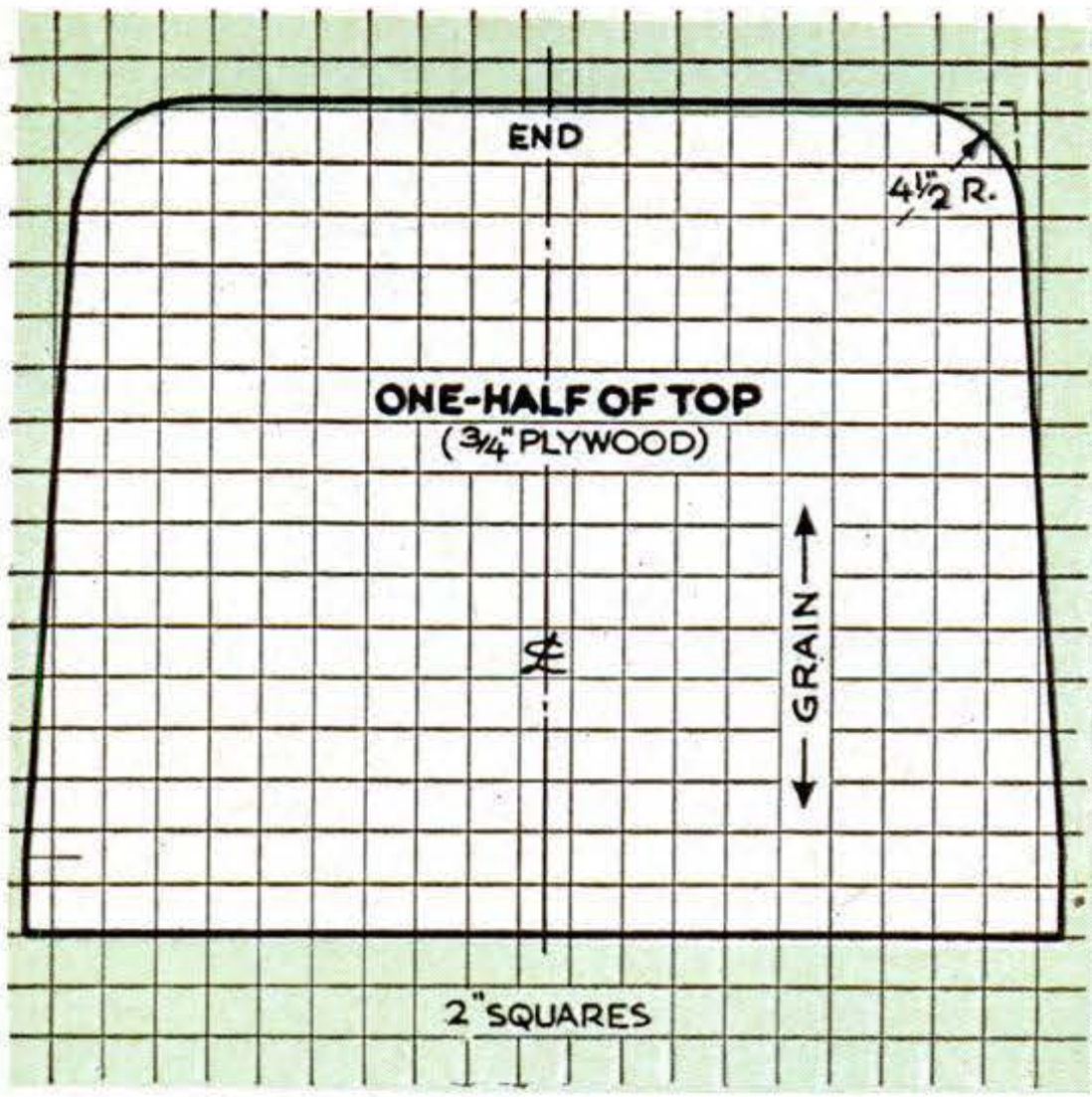


LONG DOWELS must go through glued-up ends into the main section of the stretcher. You may have to finish up the holes with an auger to get deep enough. A doweling jig is a necessity.



CLAMP LEG-STRETCHER UNIT in two-part jig (sketch). C clamp holds part 2 on stretcher; hand holds part 1 until pipe clamp is tightened. After glue sets, finish shaping by hand.





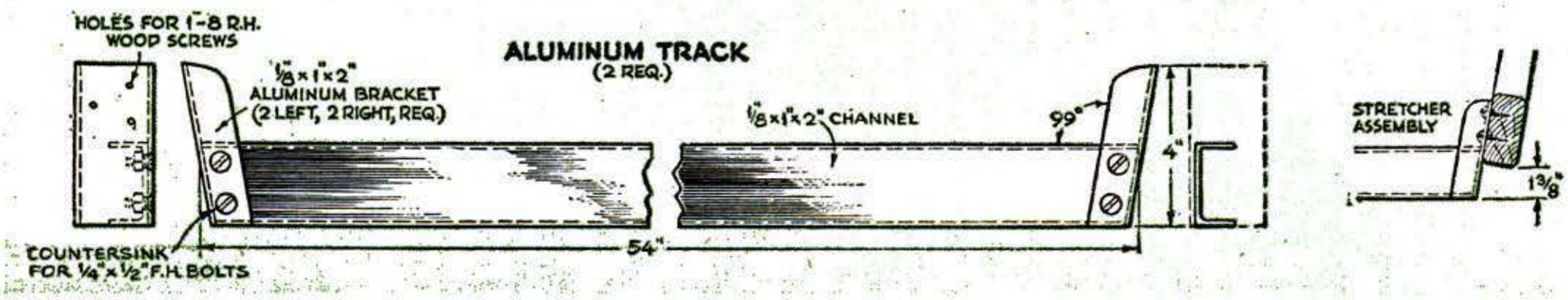
MAKING THE TOP Lay out pattern on plywood sheet to center attractive grain pattern, while leaving enough stock for leaves. Leaves are simply 14"-by-40" rectangles. Cut one half of top first, then flip it over and use as a pattern for the other half.

STRIPS of ½" plywood, glued and bradded around the under edge of the top, stiffen it and make it look more solid. To sand these strips perfectly square with the top, use an L-shaped sanding block as shown above. Do not put similar strips on the leaves or they won't nest.

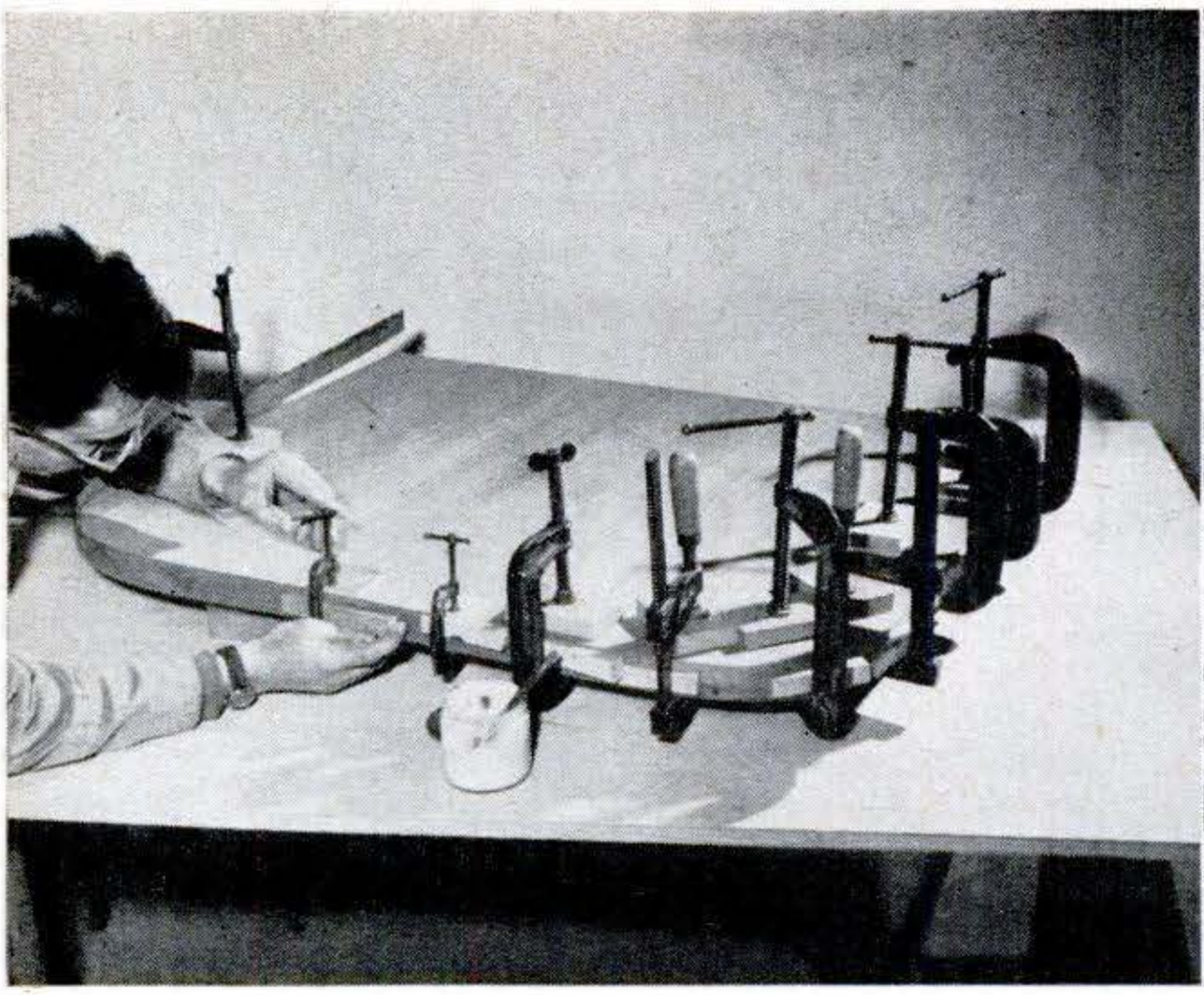
ASSEMBLING ALUMINUM TRACKS AND LEG UNITS

BOLT ON END BRACKETS with nuts and lock washers inside. Tracks and brackets are hacksawed from same stock (sketch below). Paint everything but the sliding edge to match wood.

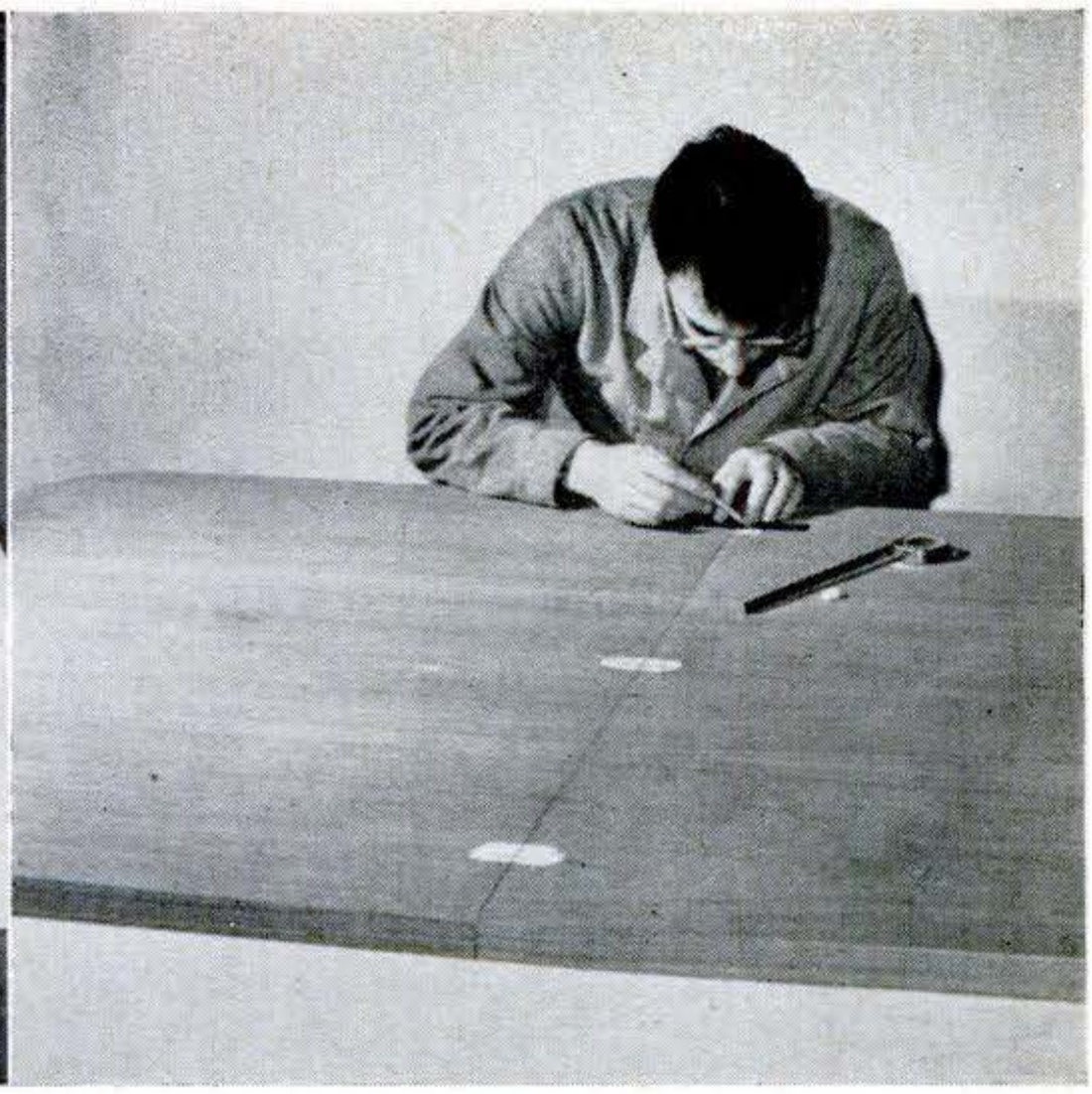
SCREW END BRACKETS TO STRETCHER, spacing the tracks temporarily with a stick 19¾" long, and spacing the stretcher off the underside of the table top with a 1⅜" block.



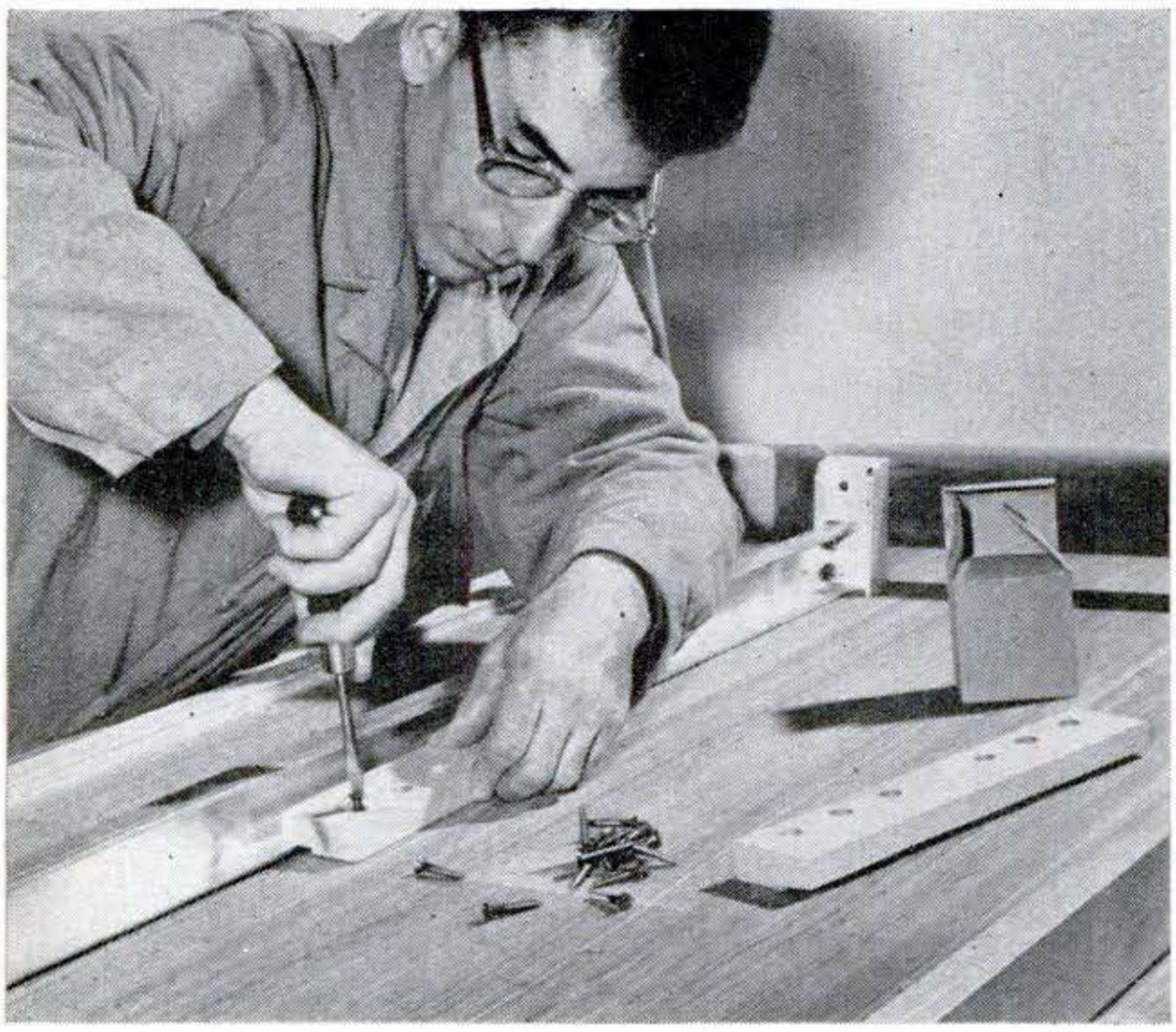
Copyrighted material



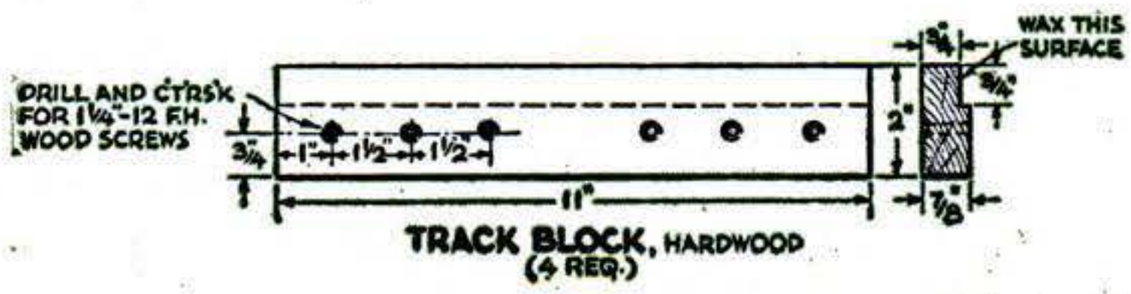
USE EVERY CLAMP in the shop to put the 3/32″ veneer around the edge. Start at one end and glue by sections. Small wooden wedges are driven between the clamp bodies and the workpiece to put pressure on the veneer. The veneer is ripped from the leg-stretcher stock.



HOLES FOR ALIGNING PINS must be precisely indexed at center and 4″ in from each side of the top. Pins are 5/16″ dowels 1½″ long, with their projecting ends rounded. Make a trial assembly and correct errors before gluing pins in place. Leaves also need aligning pins.



HARDWOOD BLOCKS, rabbeted on table saw for a sliding fit on tracks, are screwed temporarily to underside of top. Bullet catches, inset in blocks and engaging holes in track, are optional nicety. They make it easier for one person to set the top to just the right position.



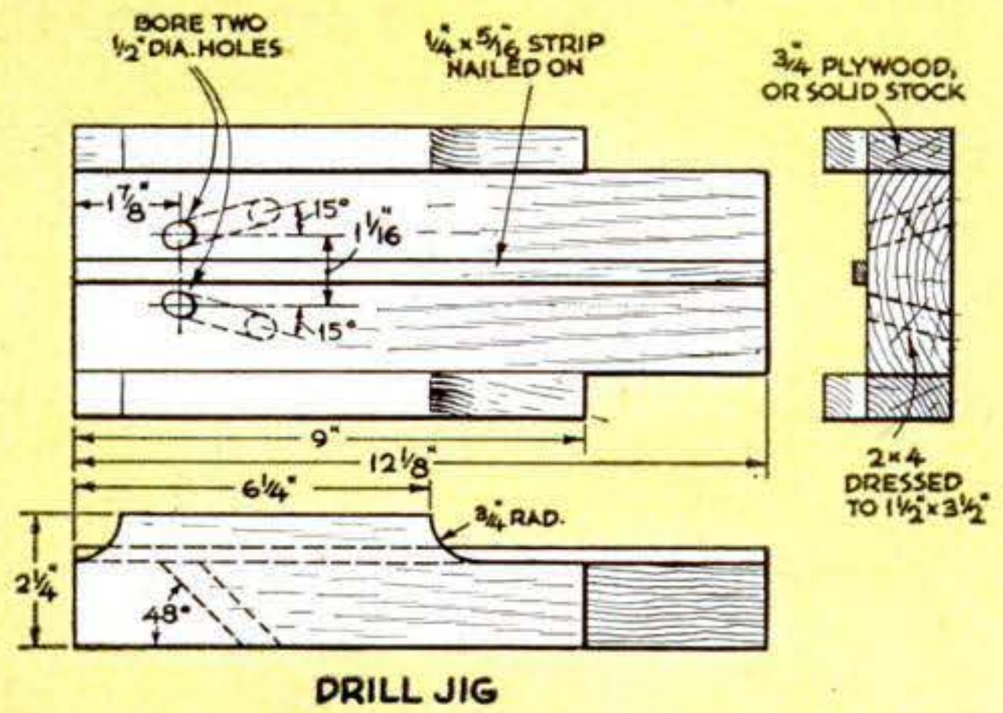
master designer here, too, in the gentle taper of the sides. The taper looks good, but more important, makes for pleasanter dining—guests sitting side by side can see each other while they talk and eat.

You cut the top from a full 4′-by-8′ sheet of ¾″ lumber-core plywood having one good veneer face. This isn't cheap, so choose it with care. Look for one with repeats in the grain pattern approximately centered. Lay out one half of the table top so that it will join the other half in the center of a grain repeat, matching attractively.

Extension leaves are cut from the same plywood sheet, so allow for them in your layout. They can be cut together or separately from either end, since they will not match the grain of the main top.

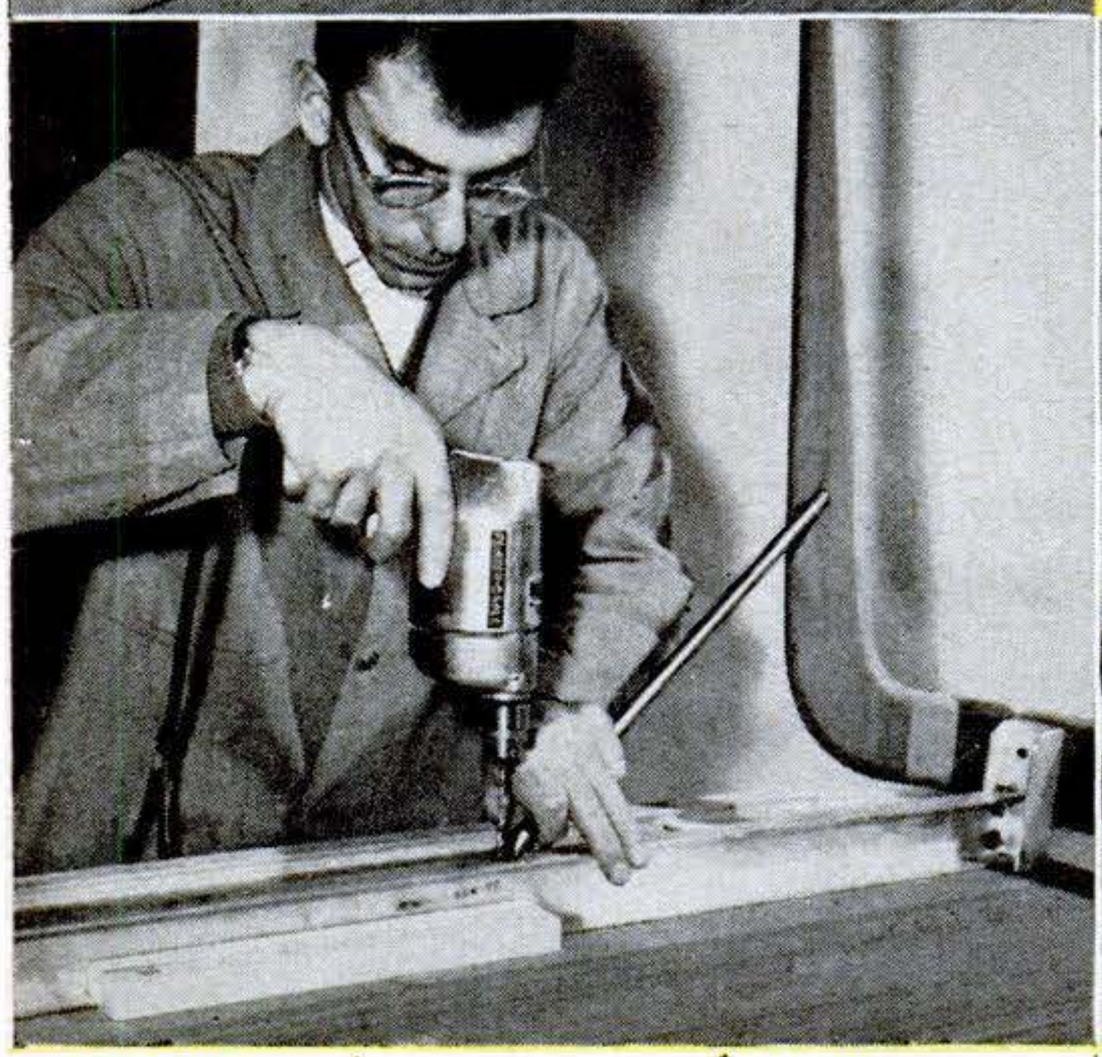
You need several jigs to get the legs and stretchers right. Most are simply scrap sawed to size or angle, but a few involve bandsawed curves. The jig for drilling the leg-strut hole, which has a compound angle, is detailed in a drawing. This jig's angled holes are easily made on a drill press: Mark the drill-press table with 15° angles on either side of a centerline; tilt the table to 48°; then line up the jig body with one angle mark

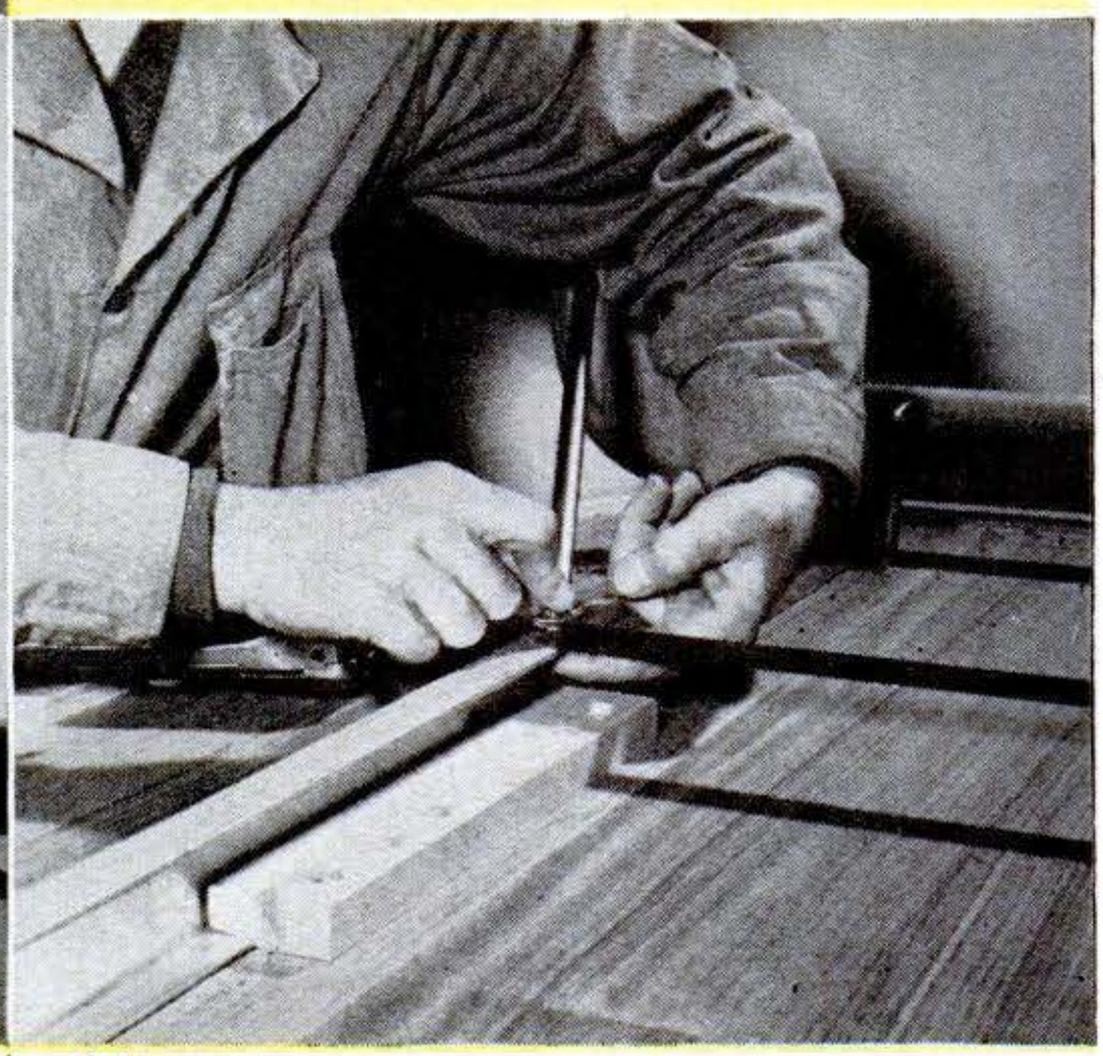
Copyrighted material

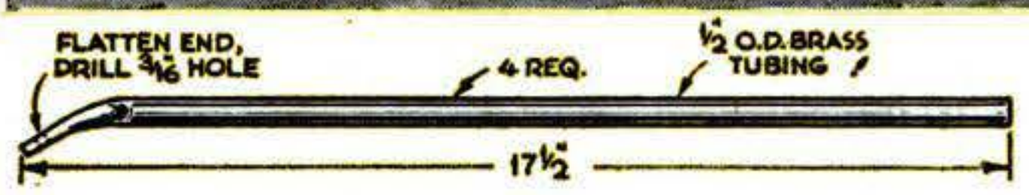


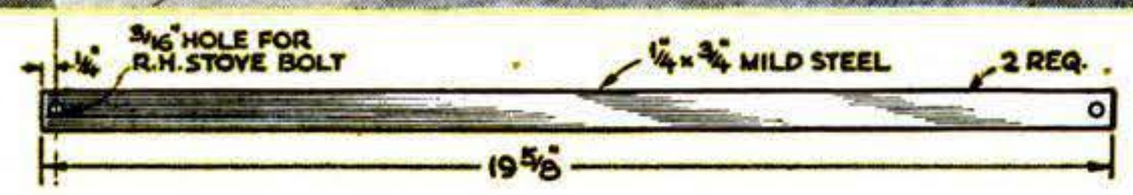
DRILL JIG

HALF-INCH HOLE FOR LEG STRUT is drilled with jig that fits right and left legs. With center strip of jig pivoting on leg, rock it into position and clamp it.









BRACES Insert leg strut and use pre-drilled hole in flattened end to locate hole in track for 3/16" bolt. Leg end of brace is drilled for 1½" No. 8 roundhead screw.

CROSS BRACE, which also supports stored leaves, is assembled with leg strut. Now try sliding action of top, re-position track blocks if necessary, and screw everything down tight.

for one hole, shifting for second hole.

Legs and stretchers are made of hardwood. Ask your lumberyard to dress them to 1⅜" thickness. You'll need one piece at least 9′ long, so that you can rip off two veneer strips, $\frac{3}{32}$" thick, for edging the table top. Rip enough extra veneer for the extension-leaf edges.

The table takes about $40 in materials —and a good bit of sweating over a hot saw. But when the family sits down to it for Sunday dinner, you'll agree that it was worth it many times over. END

NEXT MONTH: How to Build the Buffet.

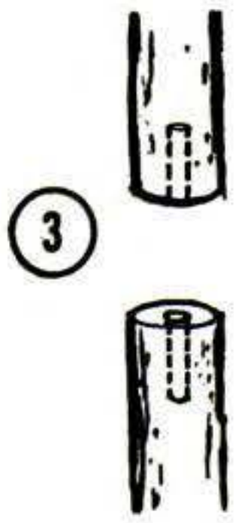
PLYWOOD STOP BLOCKS, glued and bradded on, center top when it is closed. To prevent warping, seal underside of top with same finish and same number of coats applied to top face.

Copyrighted material

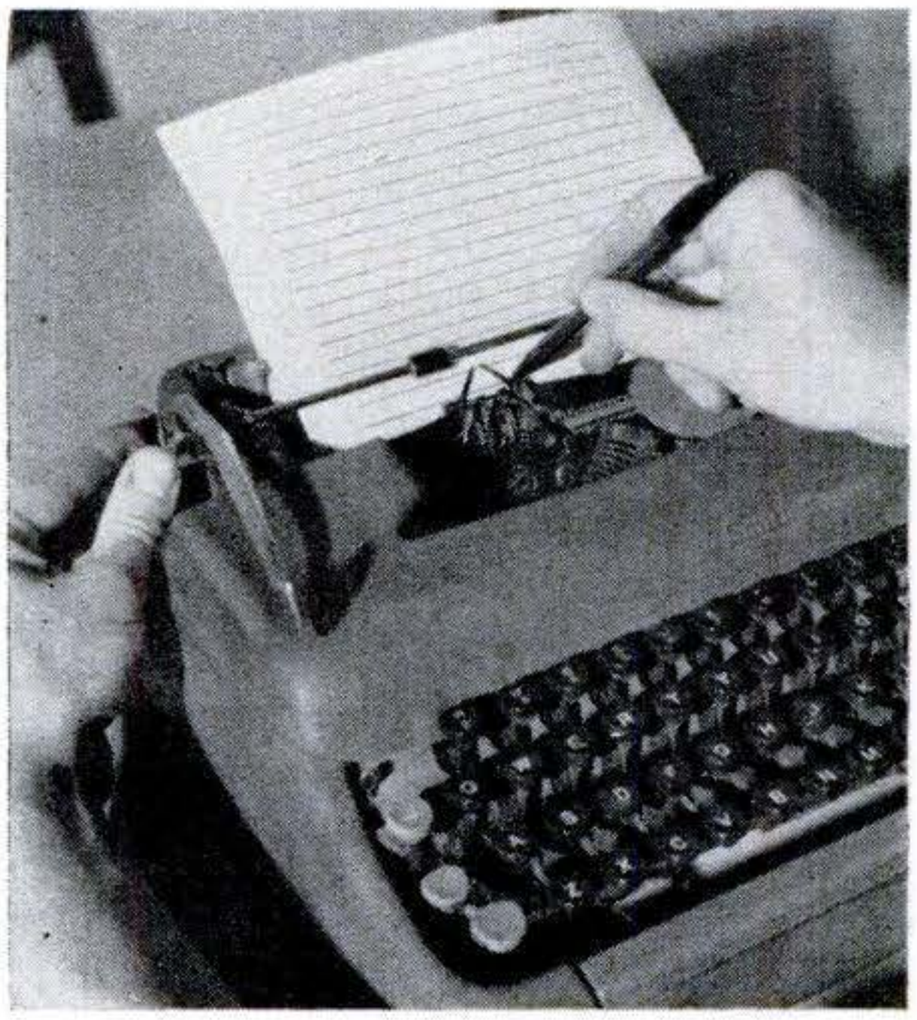
Two Poor Christmas Trees Make Good One

SPLICE together parts of two inexpensive Christmas trees to make one good tree. Here's how:

Saw a good top section (1) from a tree that's otherwise skimpy. Saw a good bottom section from another tree (2) that's rated imperfect because of a skimpy top. Bore a ½″ hole 2″ deep into the end of each trunk (3). Join the trunks (4) with a dowel glued in place.—*A. E. Cavanagh, Carle Place, N.Y.*

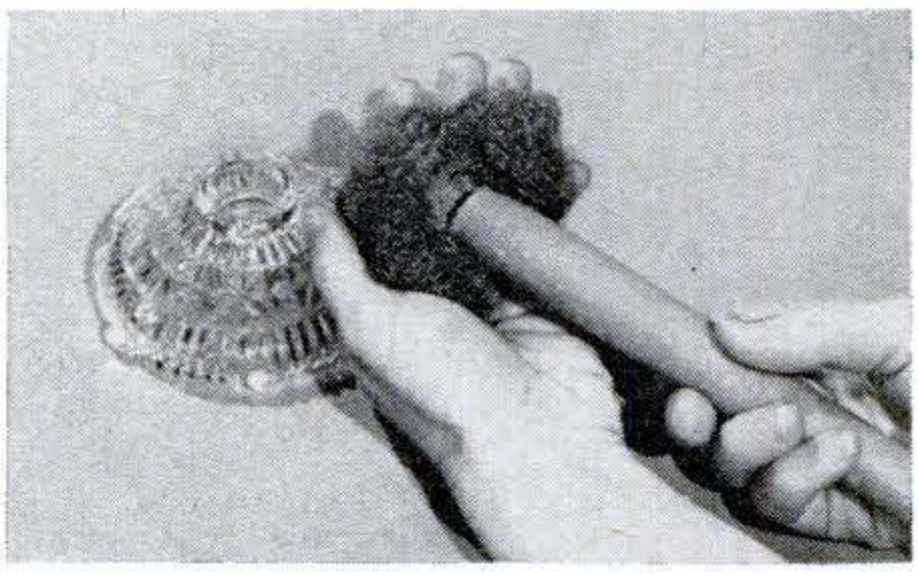


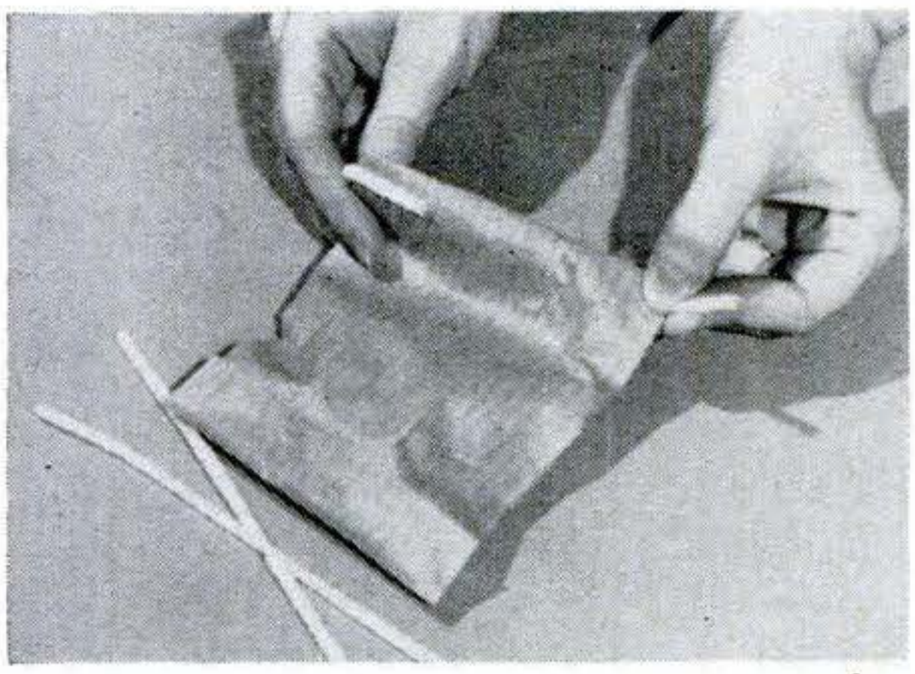
DO IT THE EASY WAY



TO DRAW PARALLEL LINES on blank paper, use a typewriter. Rest a pencil against the ribbon guide and draw the carriage from right to left.

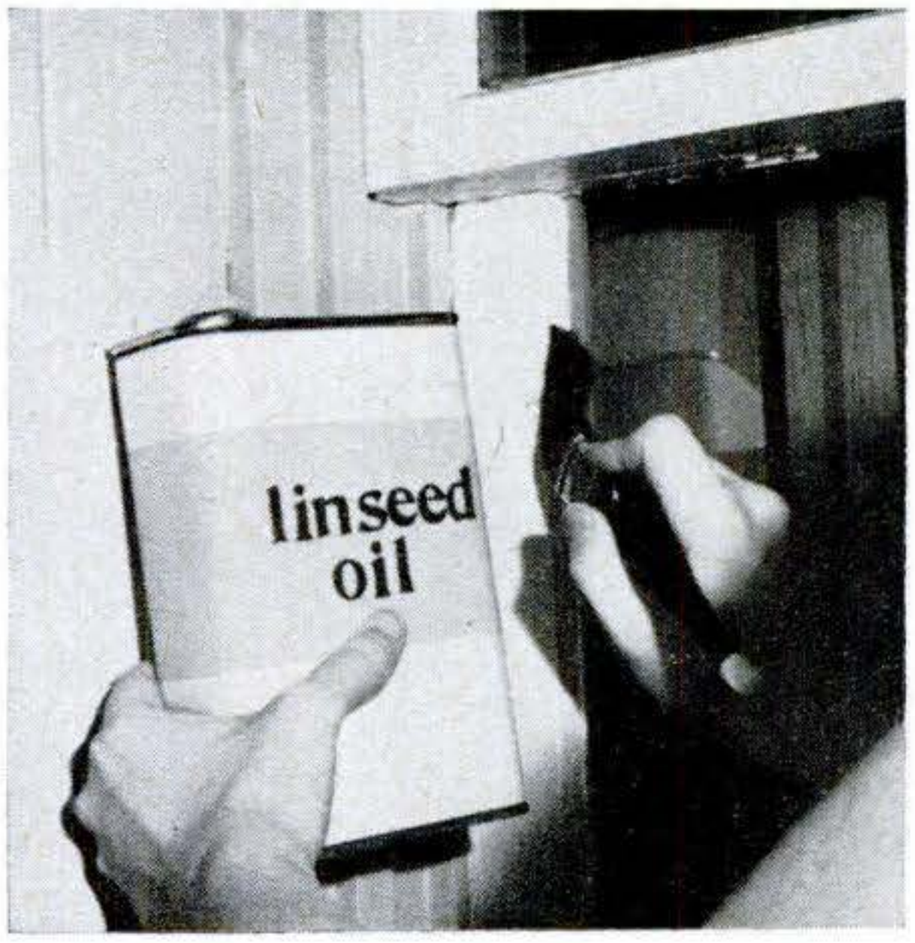
TO MAKE A CANDLE FIT a holder that's a little too small, size it with steel wool.





TO SEAL A SMALL BAG securely, fold it over a pipe cleaner and crimp the cleaner ends. Good for packaging party favors..

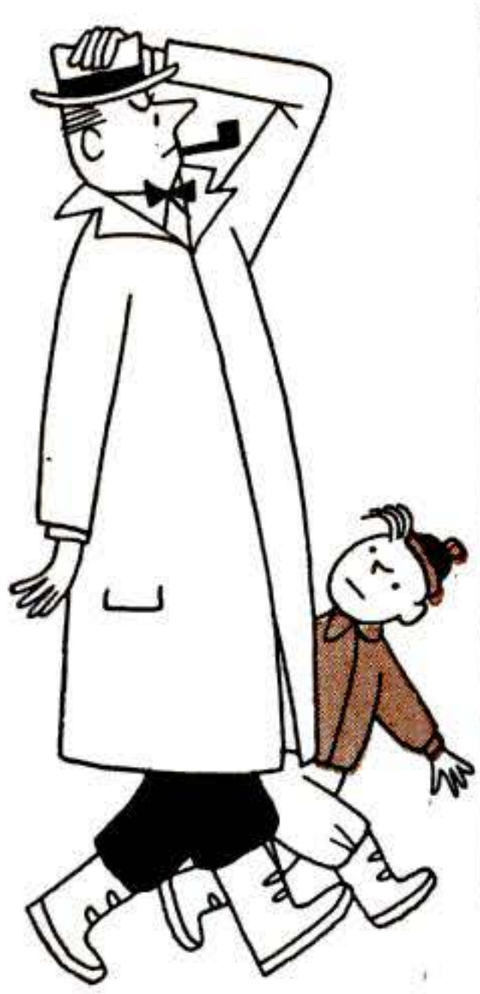
TO REMOVE OLD PUTTY with less trouble, coat it with linseed oil to soften it.

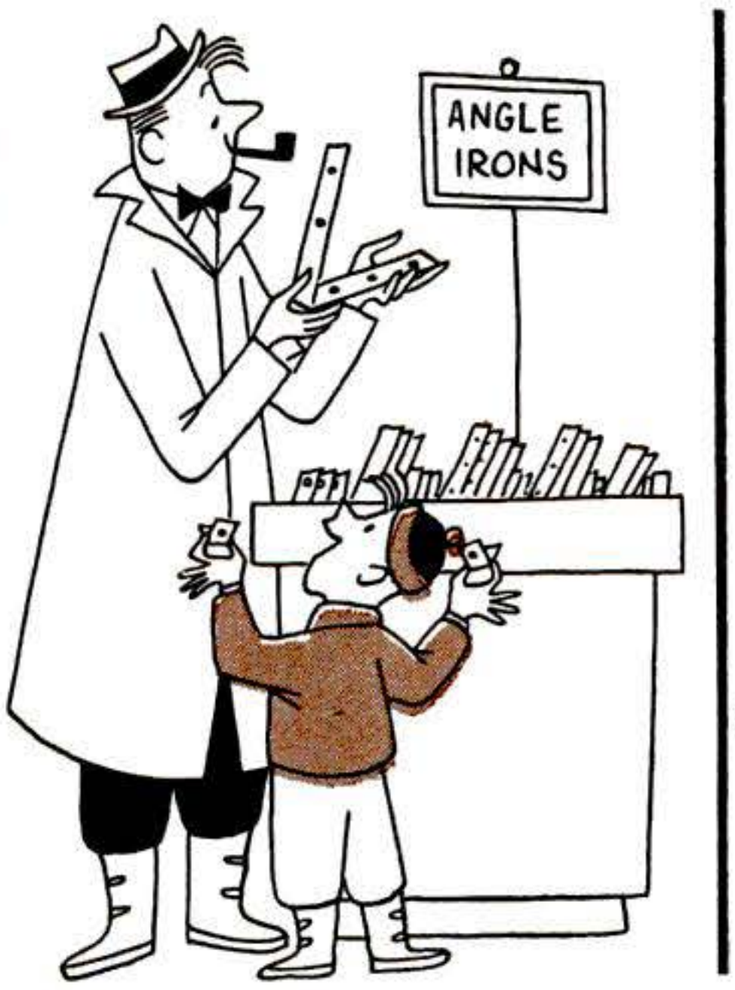


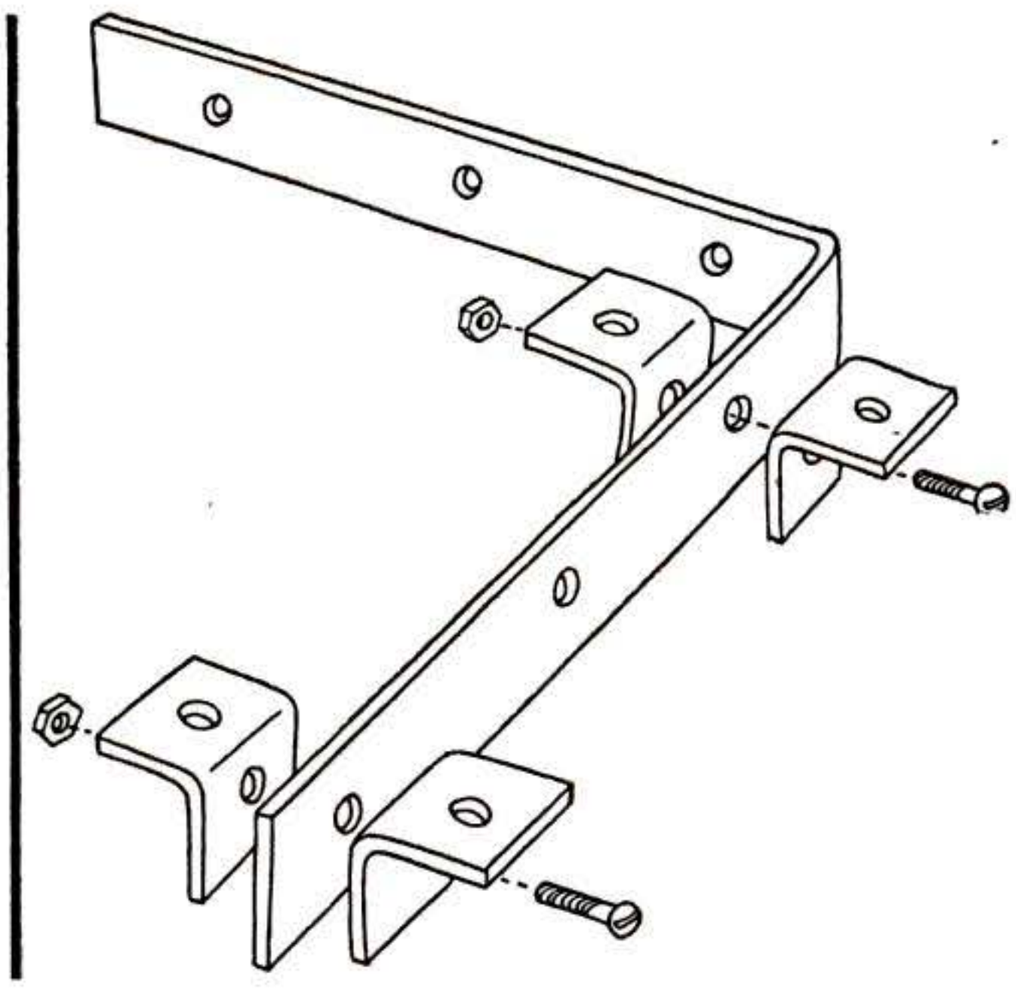
Copyrighted material

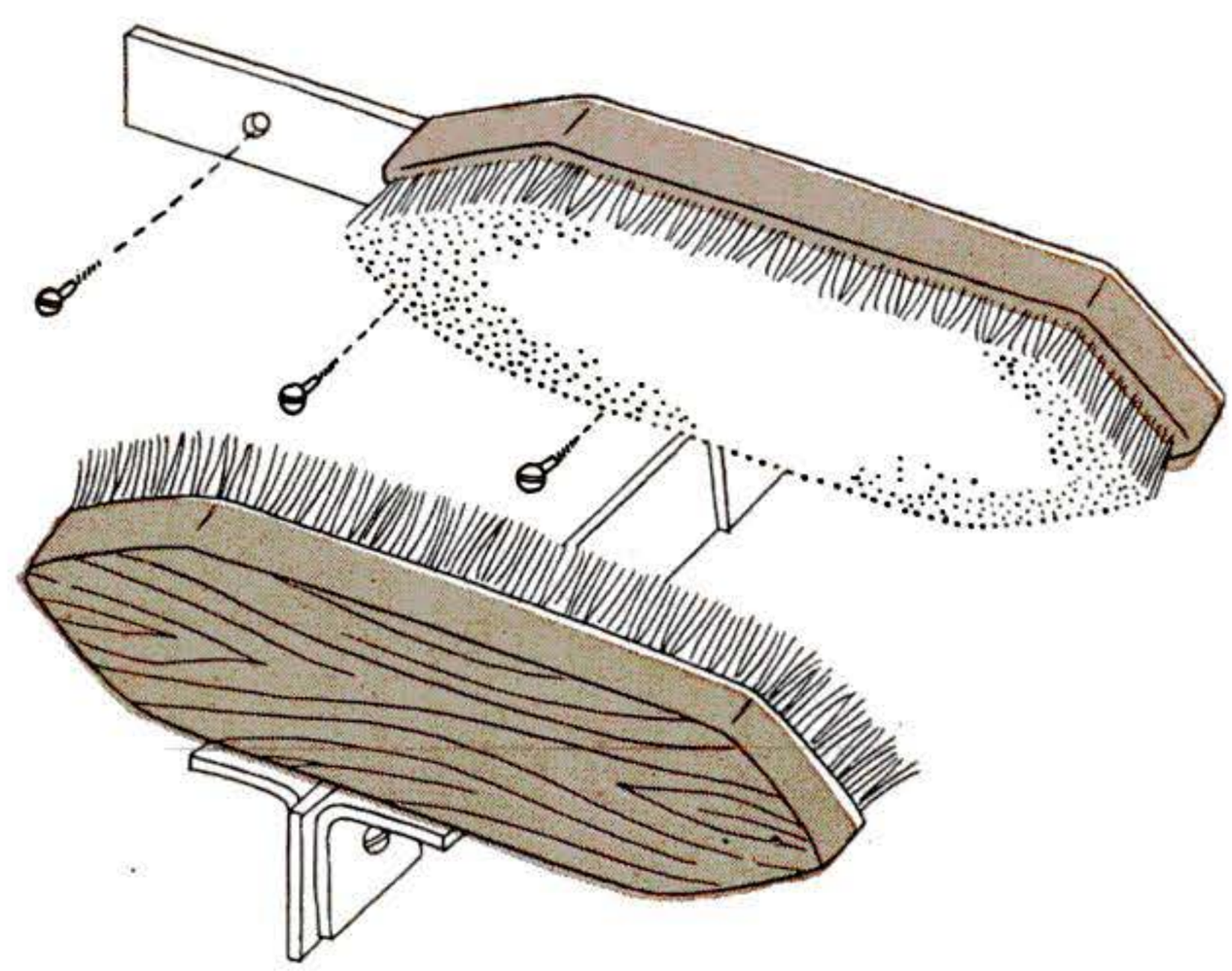
By Roy Doty and Thomas Ramirez

Wordless Workshop

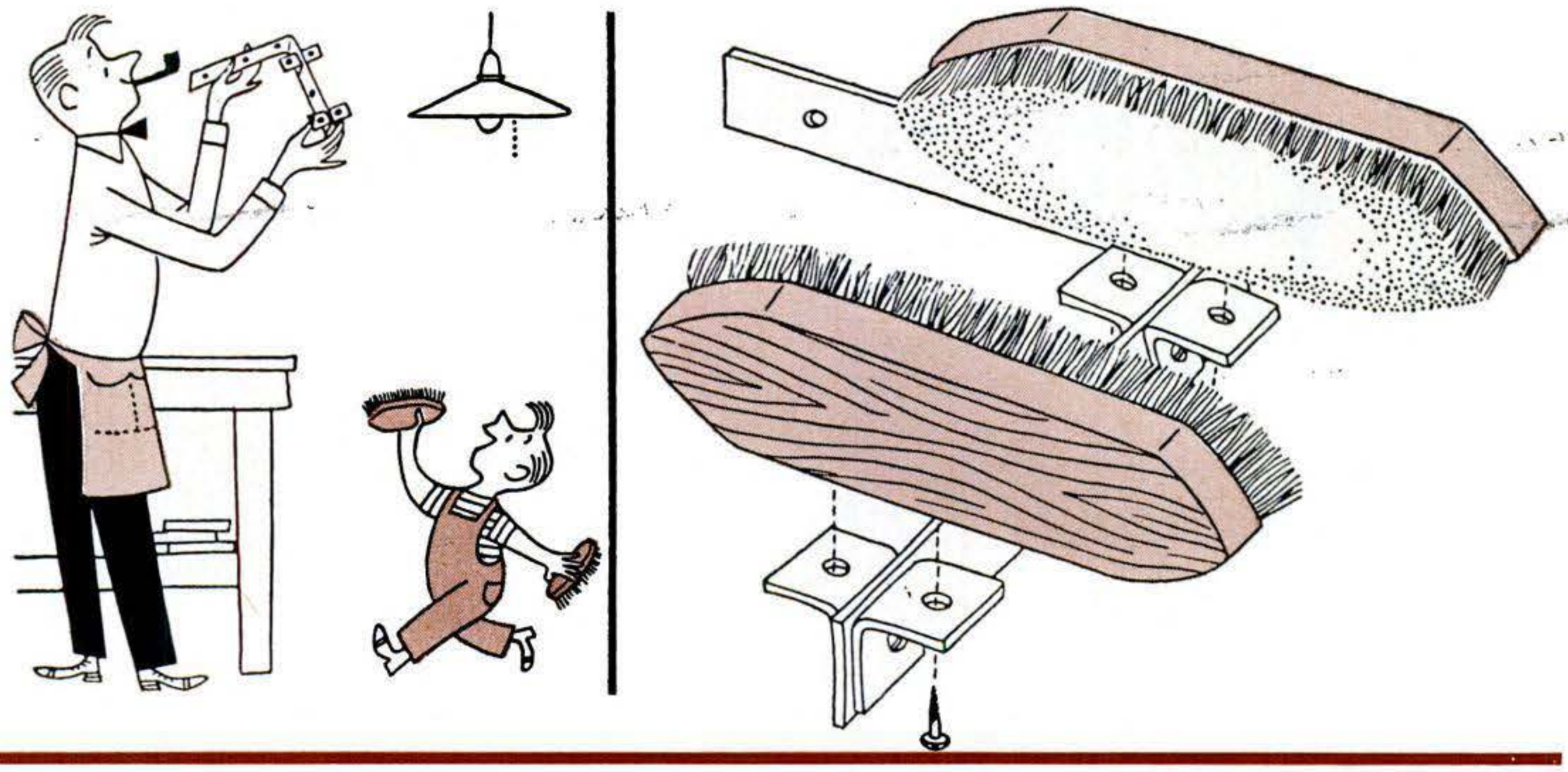


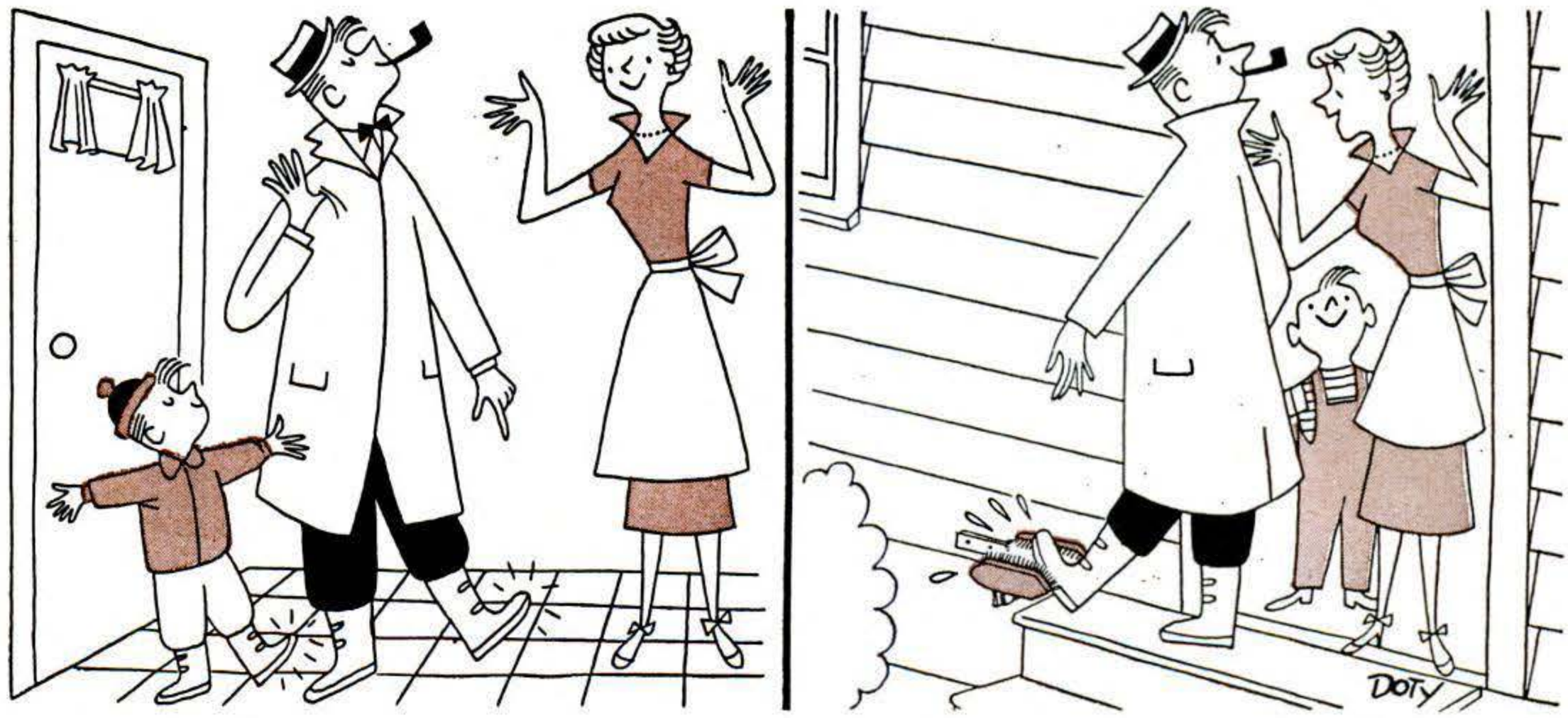






Copyrighted material

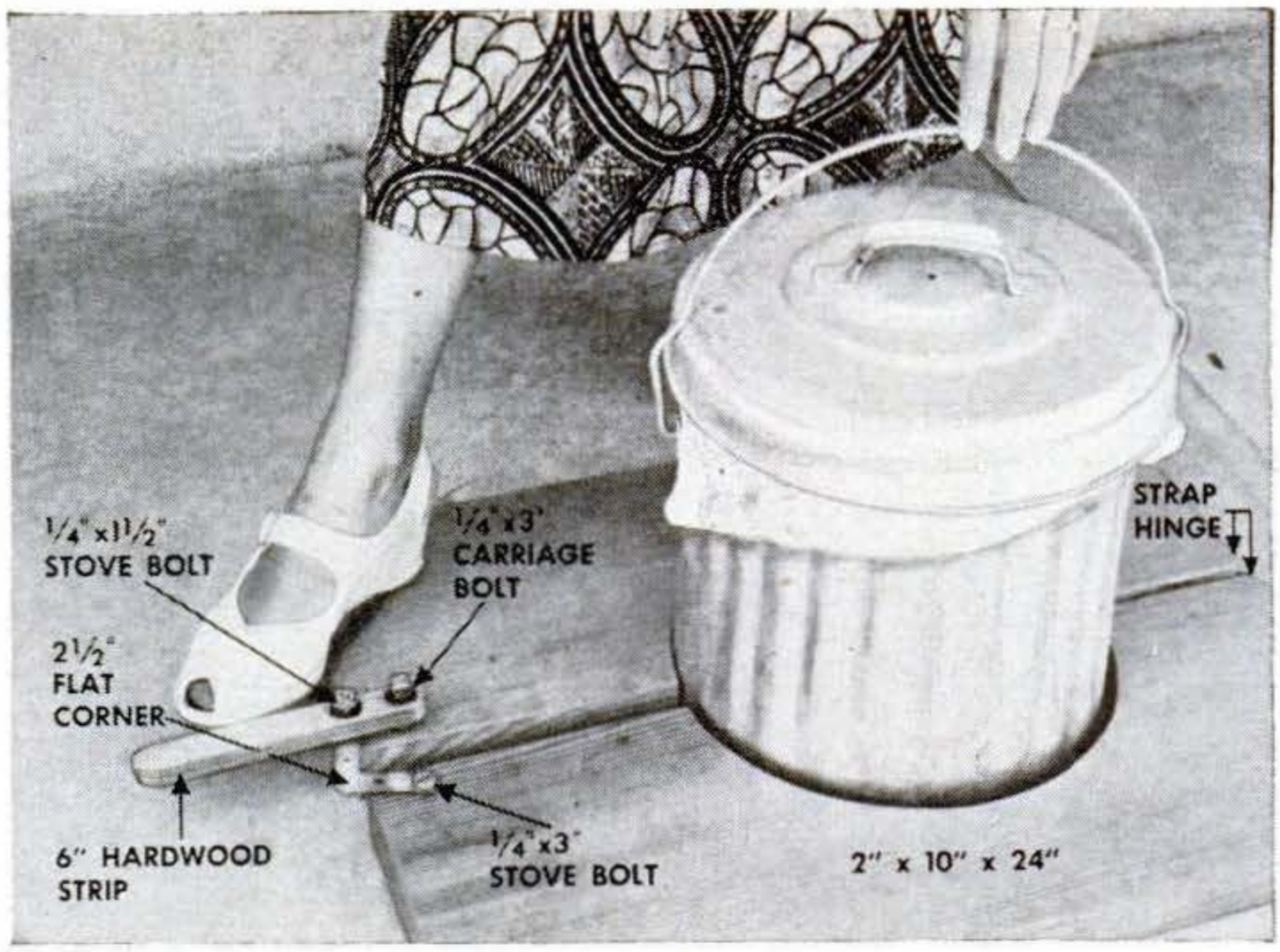




Next Month: TV snack tables that you can store flat in a closet

Copyrighted material

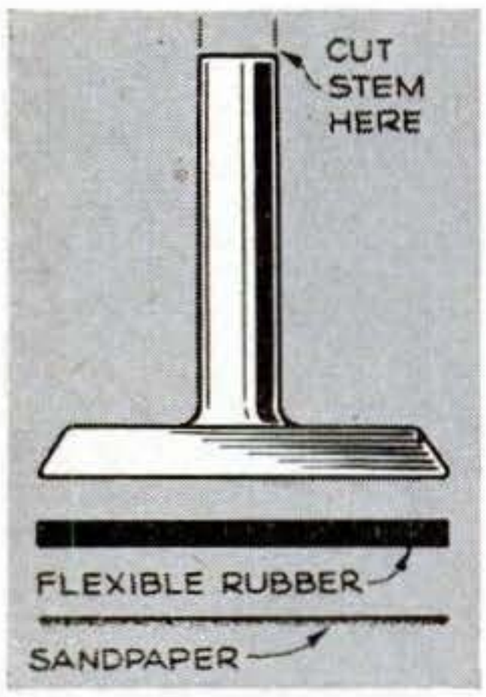
Platform Locks Pail, Lets Lid Lift Free



YOU'LL never have to wrestle a tight lid off a garbage pail if you lock it in a platform like this. And the hold-down will resist the best efforts of dogs and wind to knock over the can.

Space two 2"-by-10" planks ⅛" apart and bandsaw a semicircular opening in the side of each plank to fit around the can. Bolt one leg of a flat brass corner to a 6" lever strip and the other leg to one of the two-by-tens. The lever pivots on a bolt in the second plank, as shown. Insert washers to adjust the spacing, and lock the bolts with double nuts. Kicking the lever separates the planks or locks them around the bead of the pail. —*Edwin M. Love, Palmdale, Calif.*

Old Auto Valve Rolls as Sander



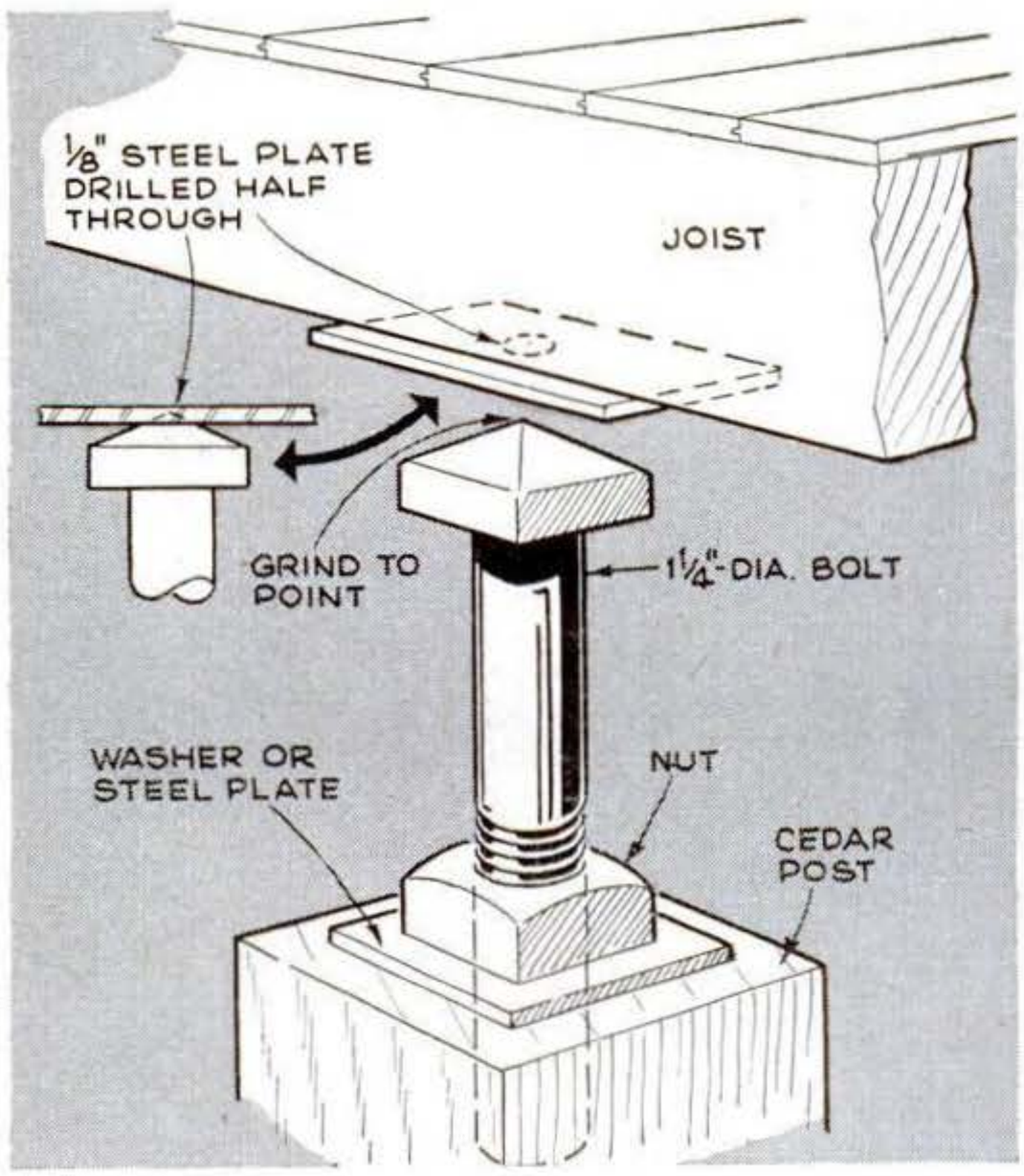
SMALL, no-cost disk sanders can be made quickly from old auto valves. Shorten the stem, leaving about 2" to grip in the chuck of a drill press.

Cement a rubber pad to the valve face and a sanding disk to the rubber.—*James Vick, Petersburg, Va.*

Drum Becomes Grinder Bench

A 55-GAL. drum serves as a workbench and motor guard for this heavy-duty grinder. J. V. Rupert, Columbiana, Ohio, cut a motor opening at the foot of the drum and a belt-clearance hole at the top, then bolted the grinder on top and a switch box at the side.

The wide base plus weight of the equipment keeps the bench steady, while its comparatively light overall weight makes it easy to move.—*John Krill, North Lima, Ohio.*

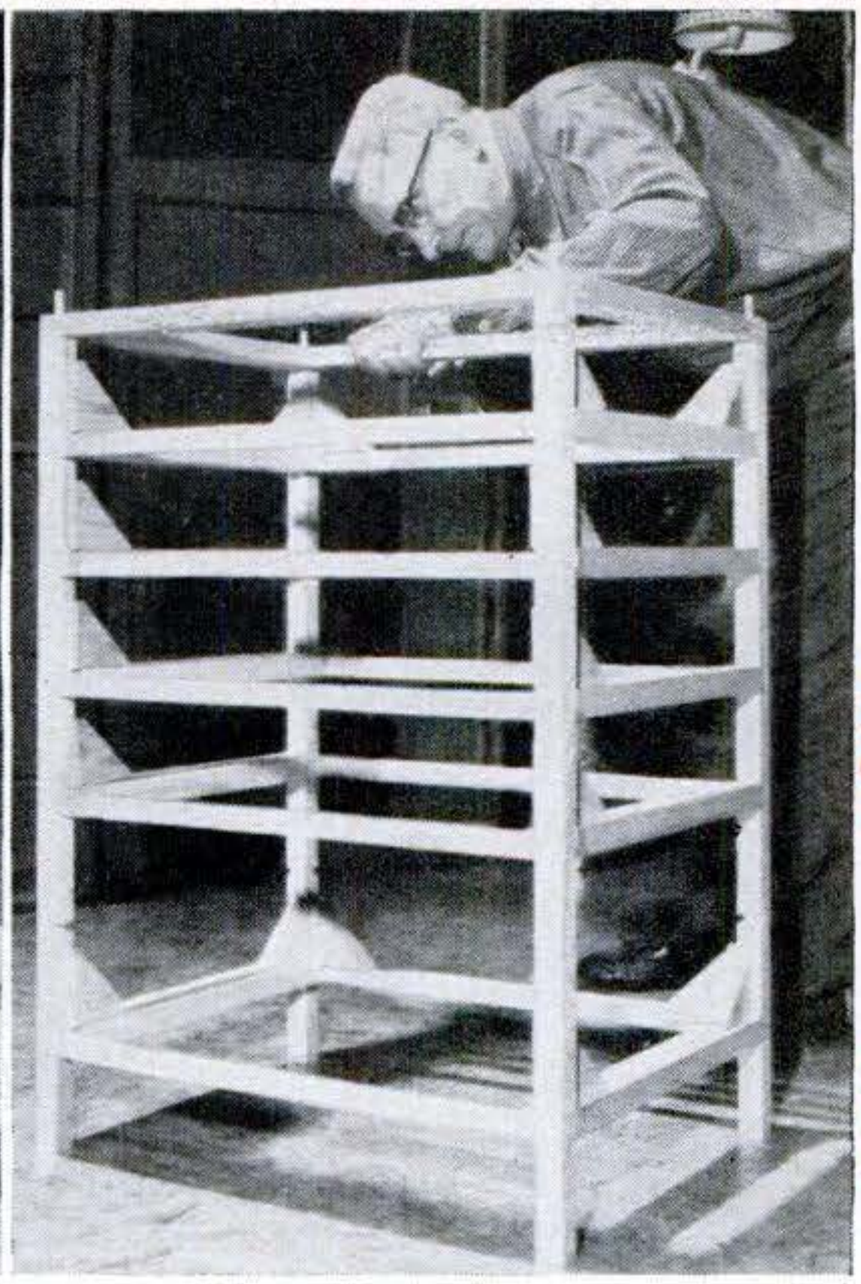


Homemade Jack Raises Floor

AN INEXPENSIVE post jack now levels a section of sagging floor in my house. All it takes is a square-cut cedar post, a 1¼"-diameter machine bolt, a steel plate, and a washer and nut.

I cut the post a few inches shorter than floor-to-joist height, then bored the top to take the bolt. A rough point on the bolt head fitted against the ⅛" steel plate, drilled half through to serve as a bearing. Two wrenches jacked the floor easily.—*E. E. Chase, Winterport, Me.*

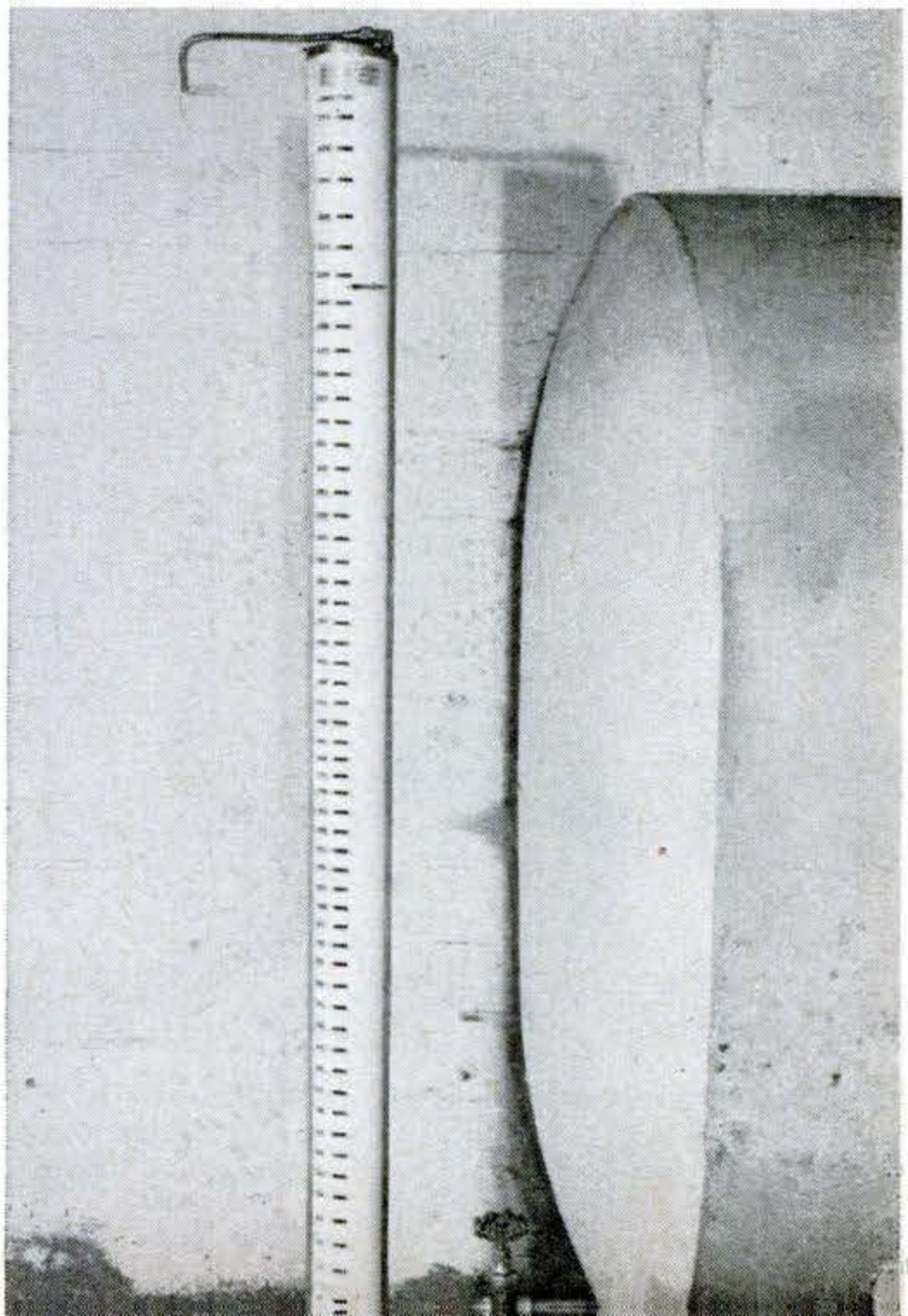
Copyrighted material



New for the Handy Man

1. Furniture Built from Kits. You don't need tools to construct a variety of furniture —from built-in cabinets to vanities. Just assemble and glue the interlocking members of this frame kit, and cover with plywood or other stock. You can also get and assemble precut drawers. Some latitude in design is possible: by using dowels in predrilled holes in the posts, you can stack units or join them side-by-side to suit your needs.

2. Fuel Gauge Read at a Glance. This gauge tells you almost to the gallon the amount of oil burned in a day, and left in the tank. It can be installed in the fuel line (between tank and burner) with a wrench and pliers. A magnet on a float inside the gauge moves an outside pointer on a scale graduated by fives from 0 to 275.

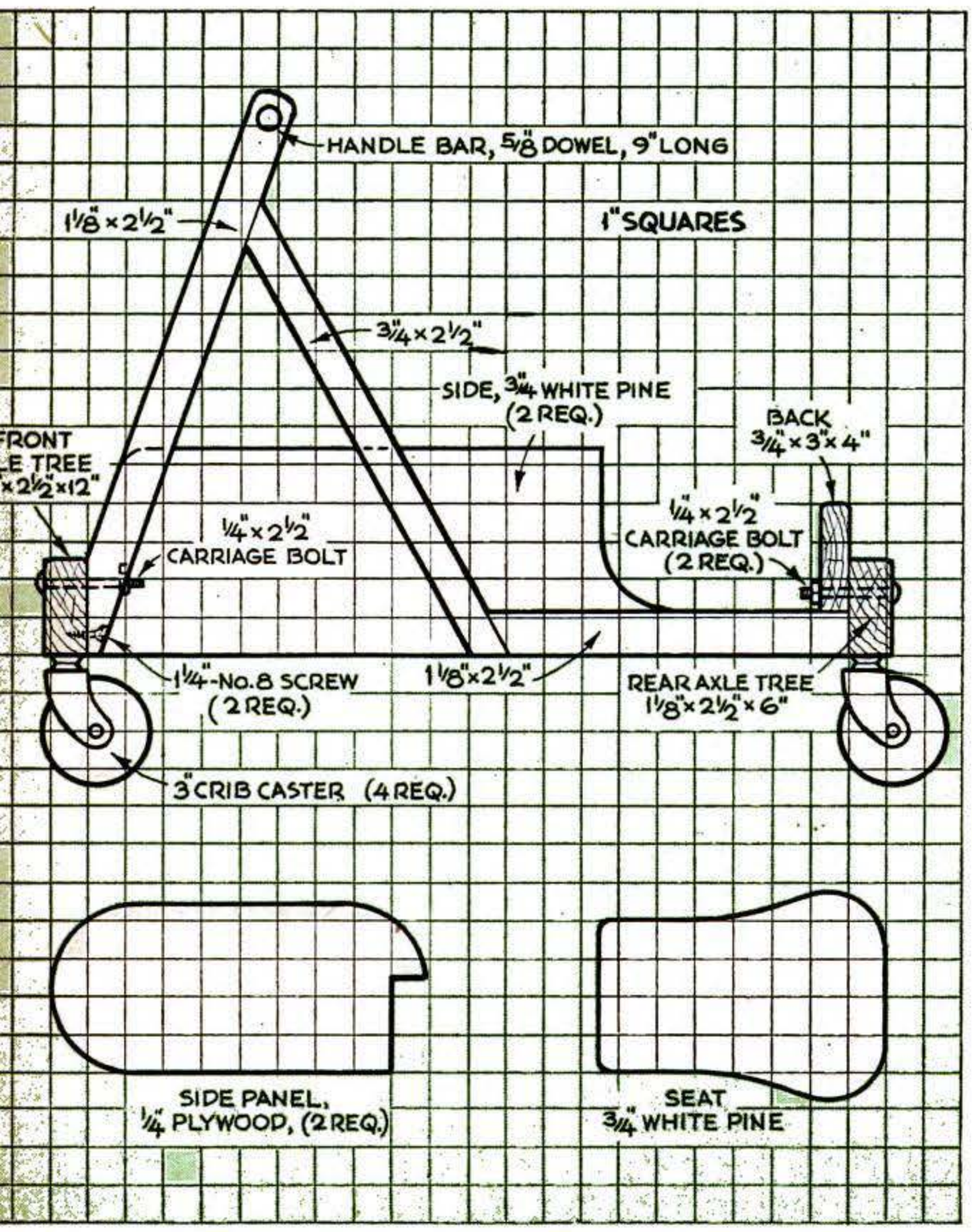


3. Bracket Holds Extra Shelf. Wherever you have a shelf already up, you can add another above it without using tools. Just tighten the two thumbscrews of this bracket onto the stationary shelf, and then fit a board across the two horizontal arms.

Further information on the products shown on this page can be obtained from: 1. Firpine Products Co., 8 N. State St., Oswego, Ore.; 2. Liquidvision Gauge & Control Corp., P.O. Box 51, Oceanside, N.Y.; 3. Wahl Specialty Co., P.O. Box 225, Monroe, Mich.

How to build a

Caster Scooter for the Toddler



A RIDING toy built for the toddling set must be simple to operate, for a child just learning to walk can't cope with pedaling or steering. But put a toy on big, easy-rolling casters and he instinctively maneuvers it to his heart's content. Add a wagon compartment and you have a toy that will remain a favorite for months. Construction is simple but rugged; the original has been in use for several years and is still going strong.

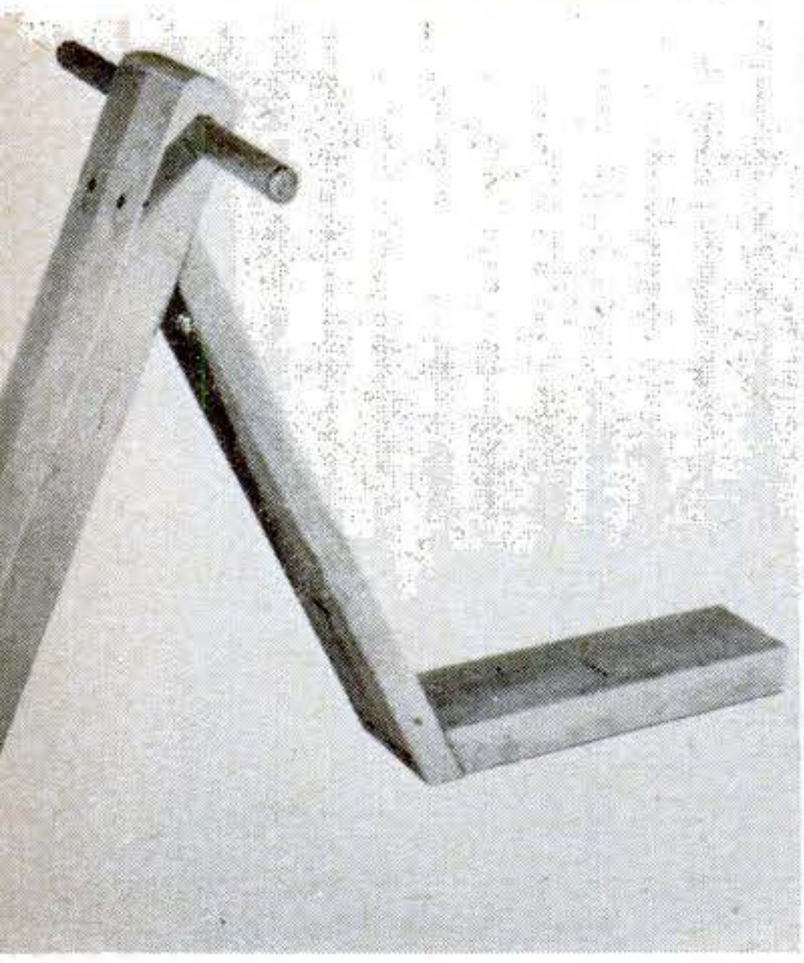
After completing the body, make up the axle trees (shown on the facing page), and drill holes 3/4" from the ends for the casters. Your hardware dealer calls them 3" rubber-wheel, grip-neck casters.

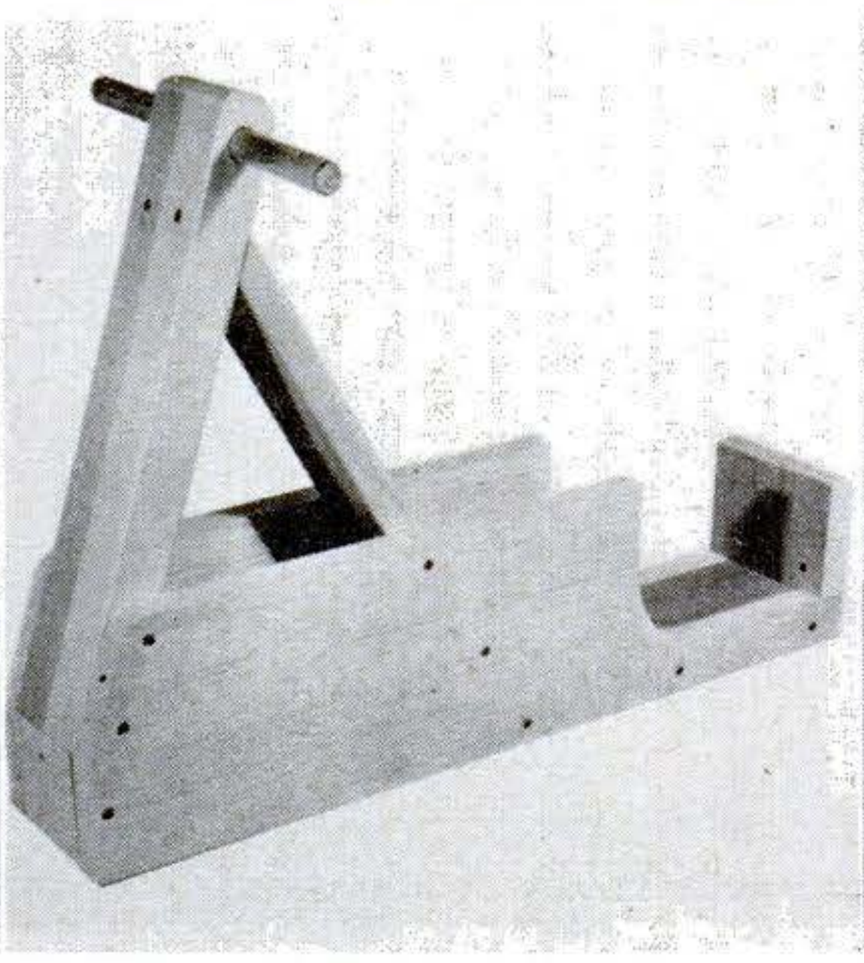
The original was finished natural with the exception of the seat and wagon compartment which were painted red. To complete the job, cut a wrap-around bumper from discarded rubber hose. Handle grips are 5/8" white-rubber crutch tips (size 17).—*Bob Johnson, Lakewood, N.J.*

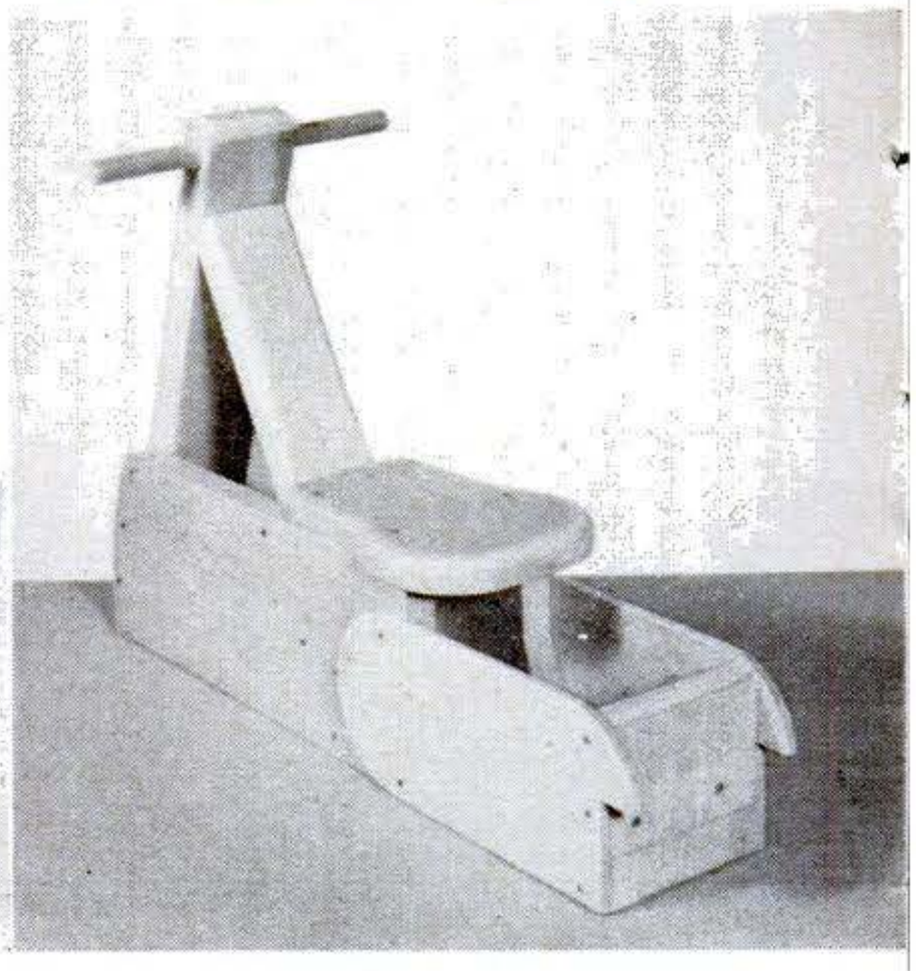
1 ASSEMBLE THE FRAME FIRST, carefully sawing the angles shown in the drawing. Drill a 5/8" hole to take the handle.

2 NAIL ON THE SIDES, which hold the seat, drill front and back for axle-tree bolts, and nail the back from below.

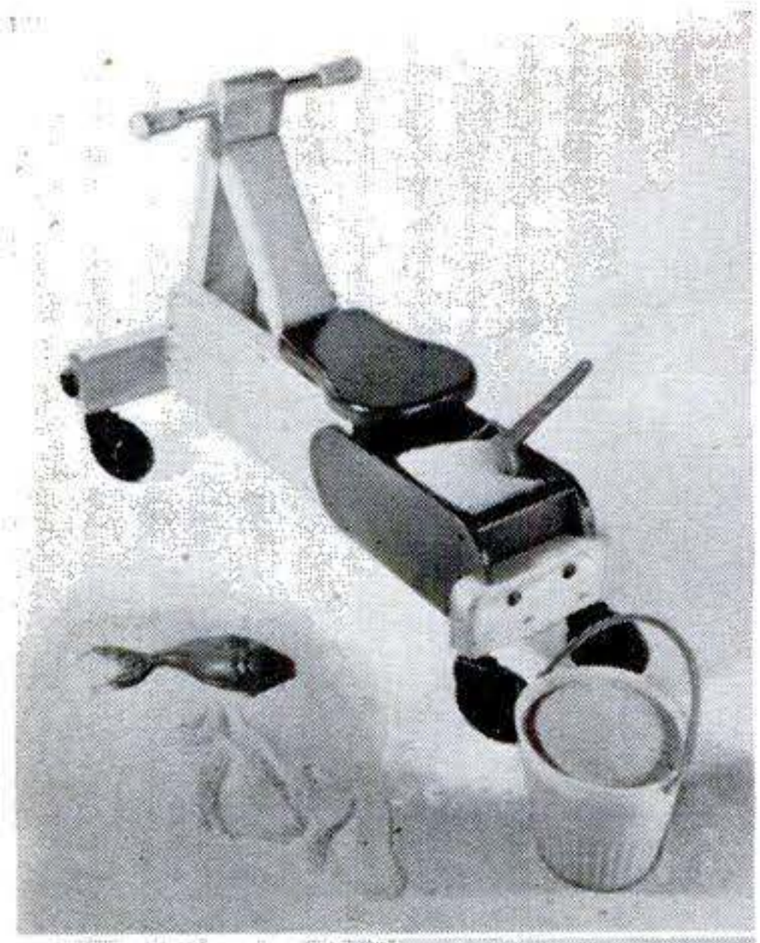
3 SIDE PANELS reinforcing the back are held by 4-penny nails (all others are 6-penny). Resin-coated nails hold best.





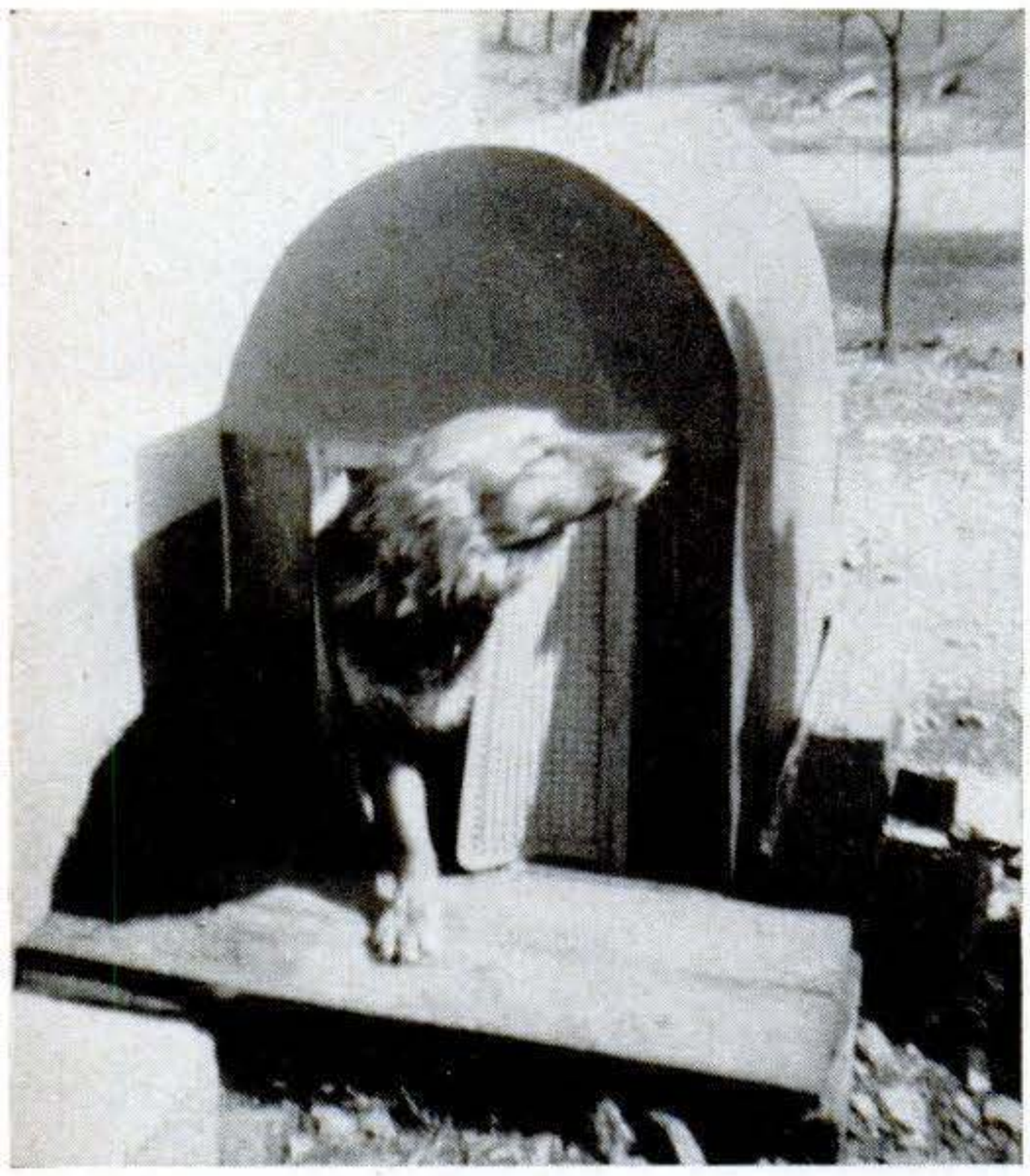


Copyrighted material



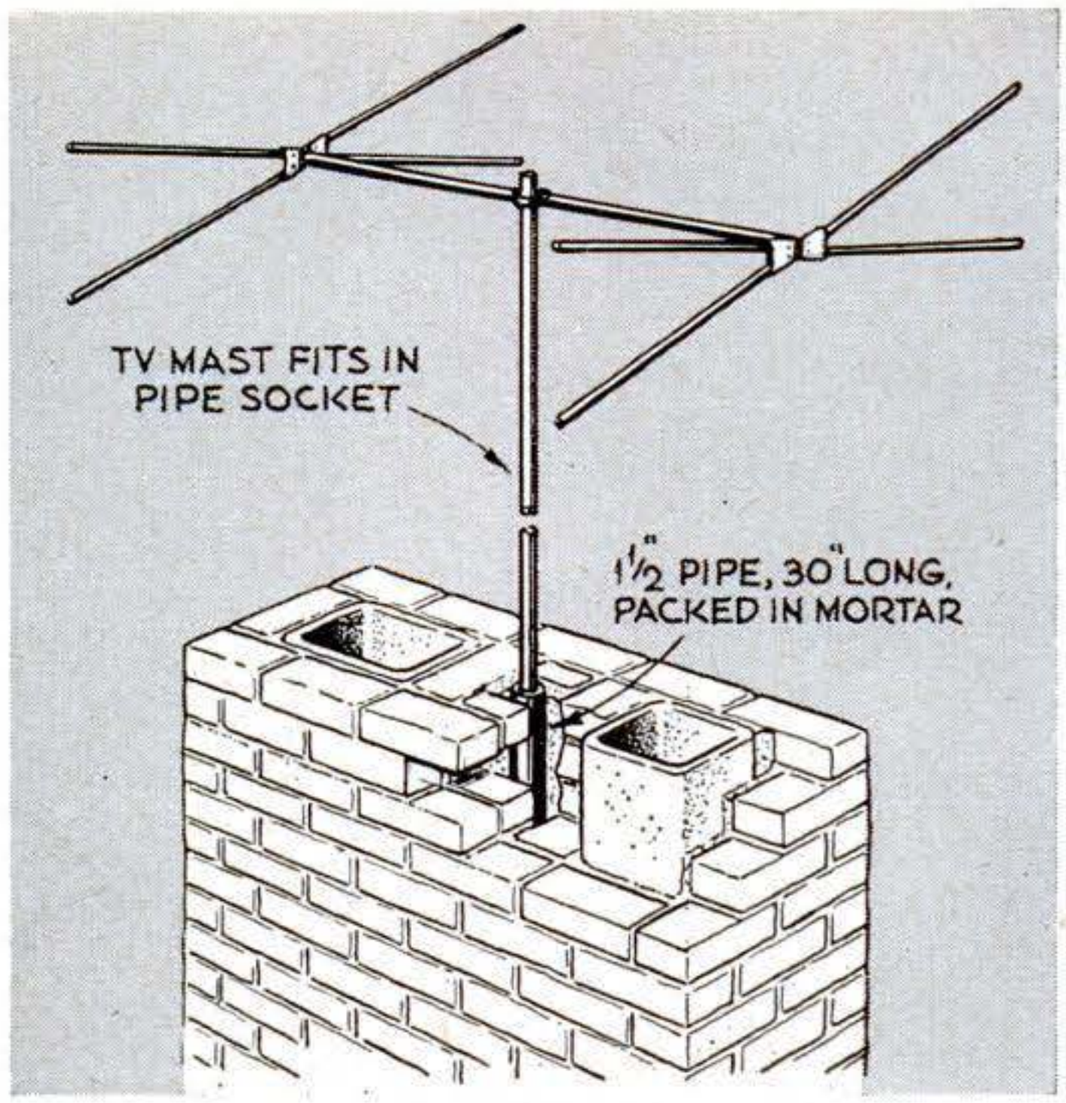
4 IT'LL BE A FAVORITE —with first-steppers or five-year-olds. It hauls dolly around in the house—or a play load of sand outside.

Copyrighted material



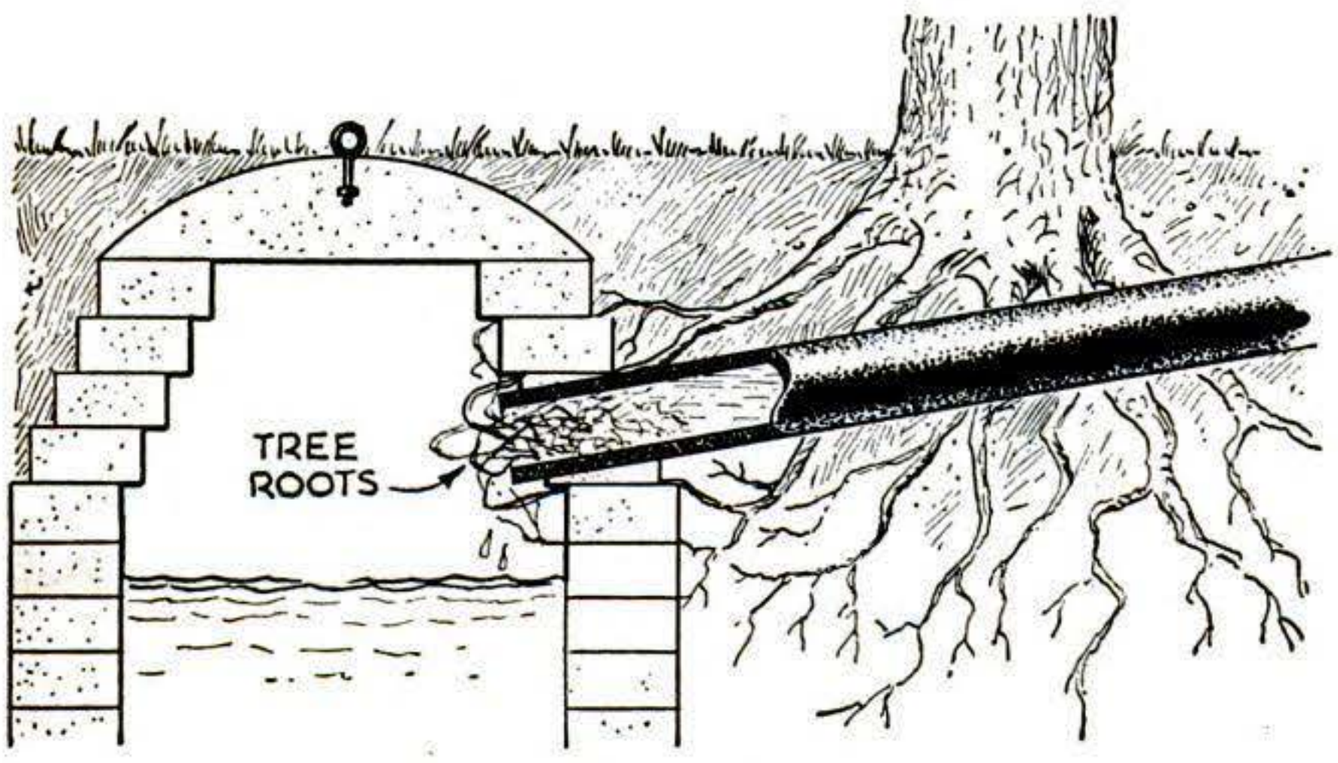
Mat Seals Doghouse Doorway

A RUBBER mat, cut in two, makes a fine wind block for any doghouse. Hinge the outer ends under wood strips; trim inner edges to meet at center, but not overlap.—*Virginia Whitman, Barnumton, Mo.*



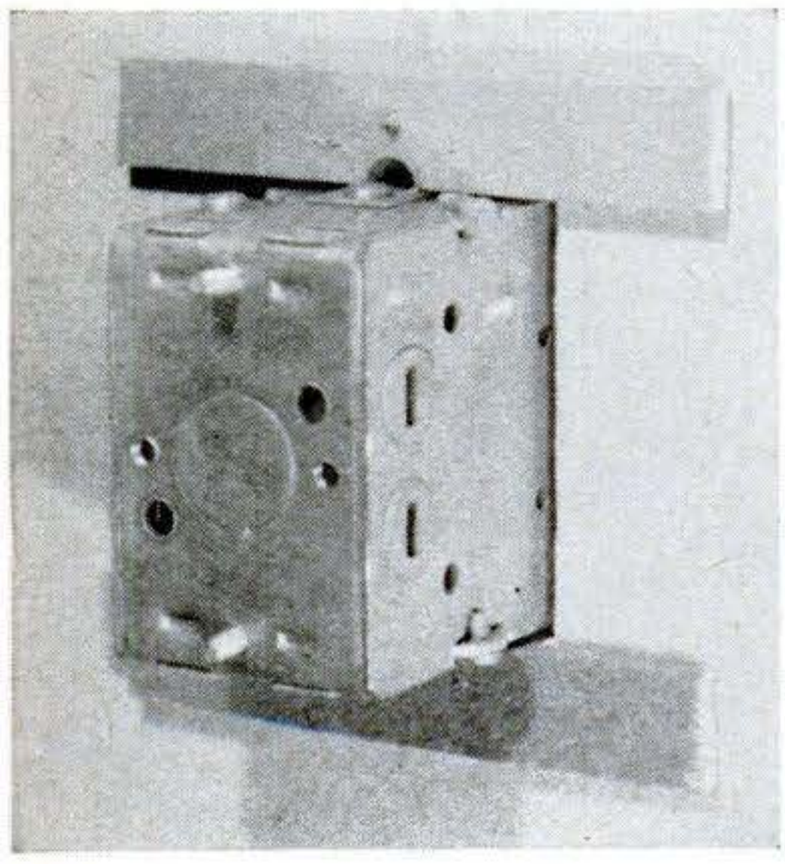
Chimney Socket Holds TV Mast

IF YOU'RE building a house or a new chimney, here's a way to provide for a TV antenna. Embed a 30″ length of 1½″ galvanized pipe in the chimney mortar as a socket for the mast. Pack calking into the pipe to make weather-tight seal between it and mast.—*D. X. Manners, Norwalk, Conn.*



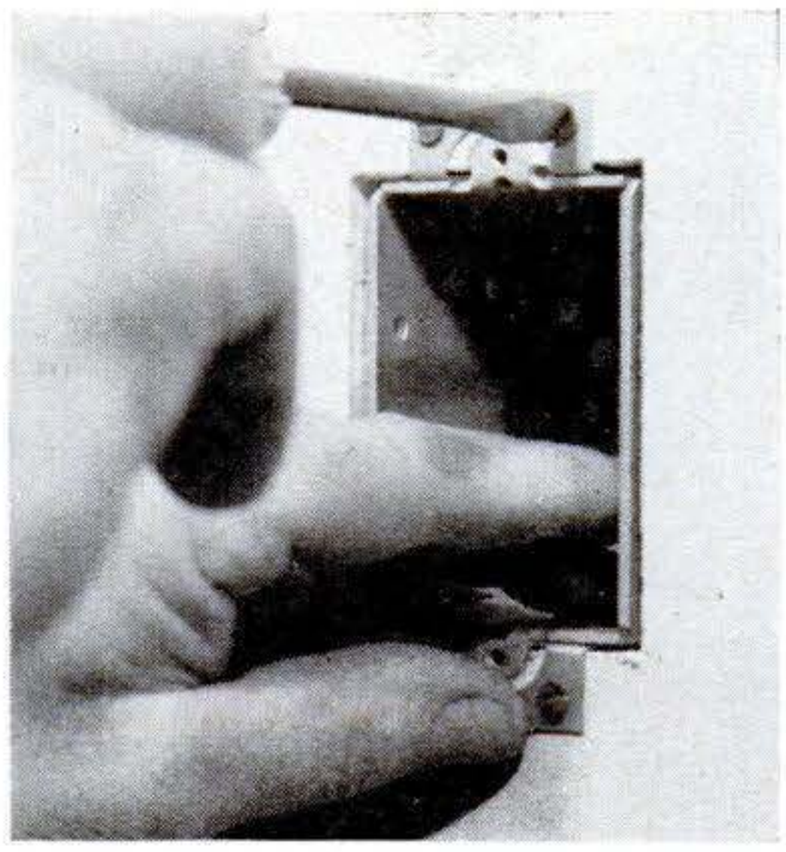
Extension Clears Pipe of Tree Roots

SOME time ago I was forced to open a cesspool because tree roots had clogged the soil pipe leading to it. The roots had driven through the tank wall and up into the discharge end of the pipe. A 1′ extension of the pipe into the tank cured the trouble.—*Hi Sibley, Nuevo, Calif.*



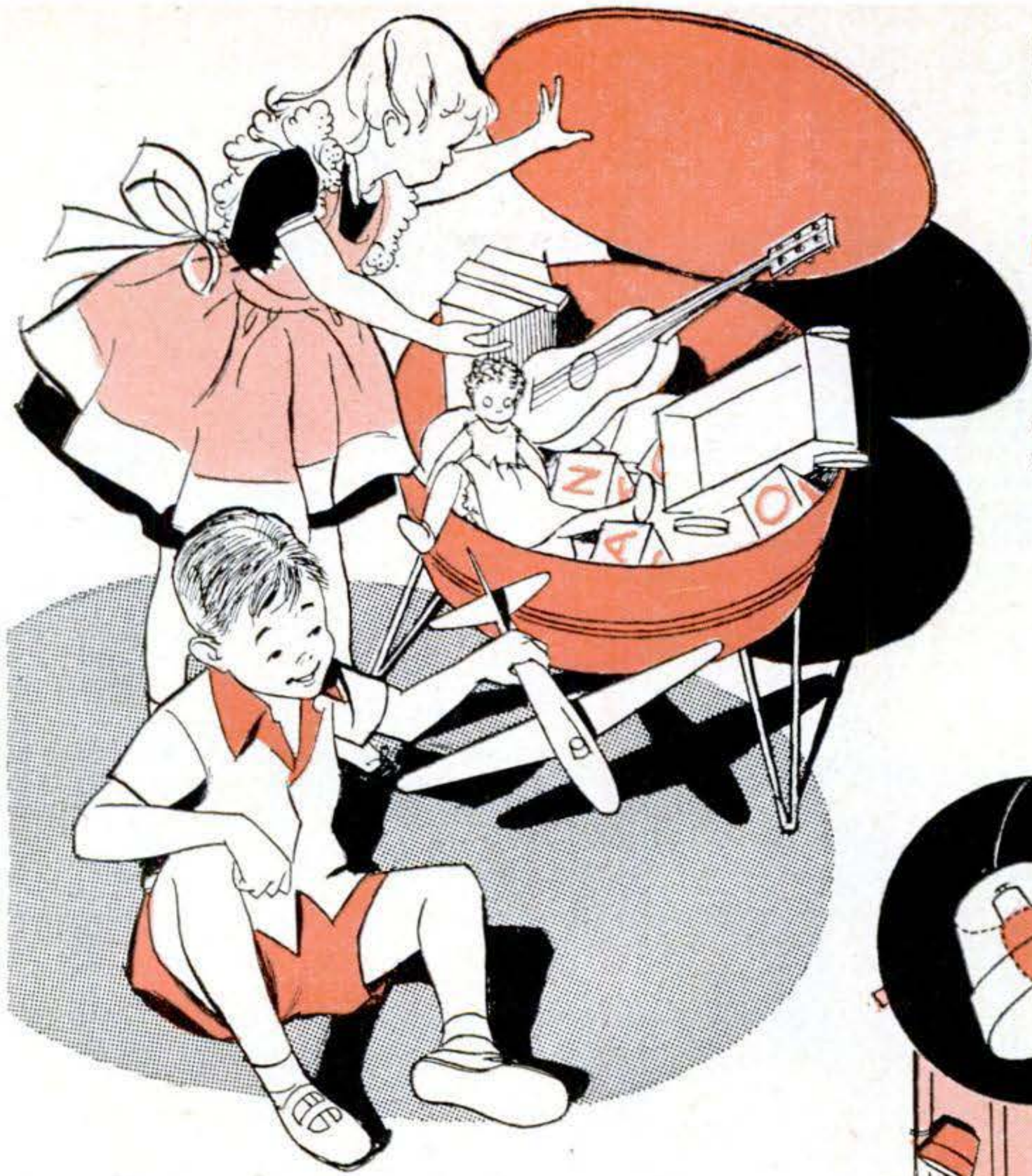
Wood Strips Hold Switch

TO MOUNT a switch or outlet box on plasterboard, notch two wood strips (left) to clear the receptacle screws, and fasten behind the wallboard with wood screws driven from the front (right). Then mount the box.—*Herbert Y. Moon, Orient, L.I.*



Copyrighted material

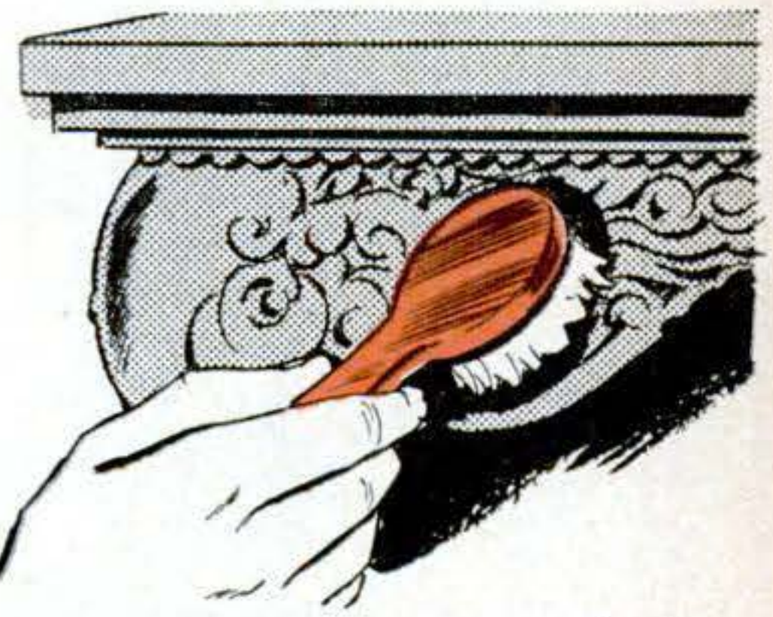
KEEPING THE *Home* SHIPSHAPE



A TOY TUB will hold all the loot from Santa. It's a fancied-up washtub on hairpin legs. A plywood lid makes a fine play surface.

CHRISTMAS BELLS add beauty to a doorway decoration. Paint tiny flowerpots bright red or spray with artificial snow. Outdoor light bulbs for clappers add illumination.

A HINGED COUNTER will allow you to use an electric broiler without moving it from the cabinet. Cut through an end section of the counter so that it folds back against the wall.



TO POLISH DEEP-CUT GROOVES in furniture to a sparkle, try a soft, new shoe dauber. It will get dirt out and polish recessed areas that an ordinary furniture duster usually misses.

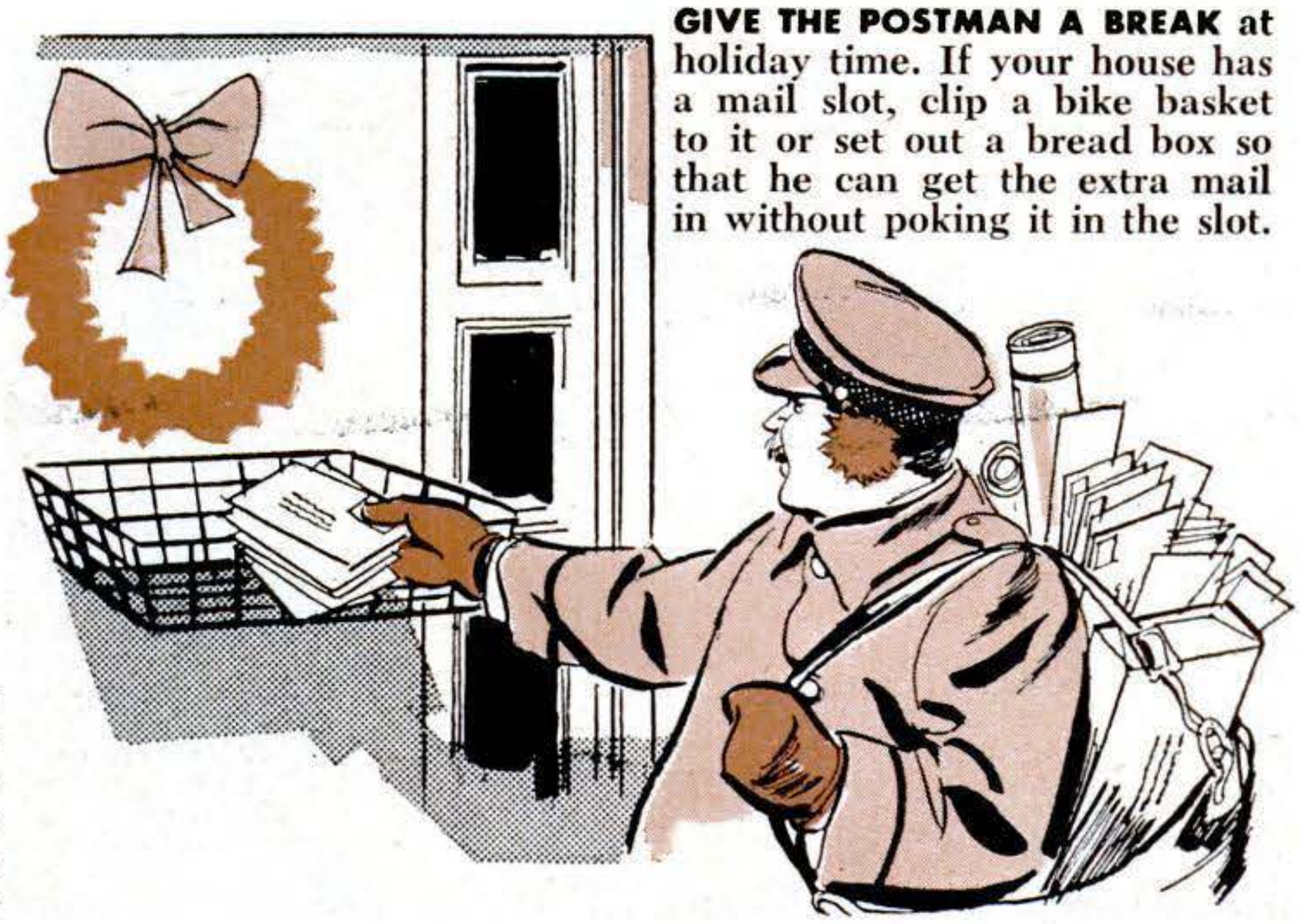
Please turn the page for more home tips

Copyrighted material

More Home Tips

LIKE TO DISPLAY CHRISTMAS CARDS? Slip them over up-tilted slats of Venetian blinds. If the fold is at the side, tape the cards on the blind.

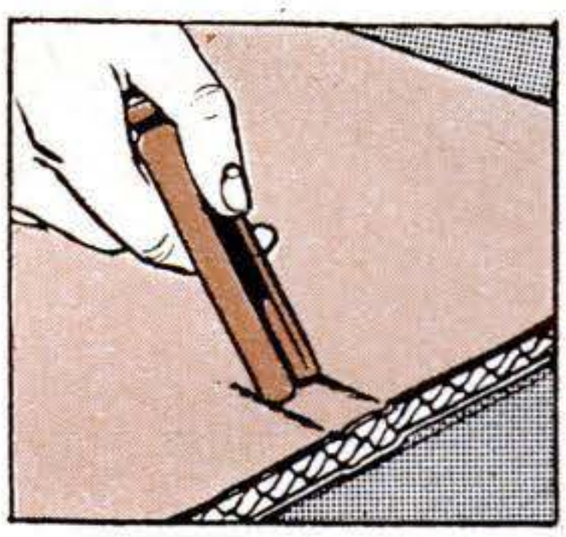
REFRIGERATOR NOISE won't trouble your sleep if you put small rubber pads under the feet of the box. They'll damp some vibrations, and keep others from going through wood floors.



GIVE THE POSTMAN A BREAK at holiday time. If your house has a mail slot, clip a bike basket to it or set out a bread box so that he can get the extra mail in without poking it in the slot.

TAPE THE ENDS of cut evergreen branches when you decorate for Christmas. A wrapping of transparent or green-colored tape will keep sap from oozing out and leaving gummy stains.

A CLOTHESPIN is a handy tool for scoring a corrugated cardboard wrapping. The blunt wooden "knives" won't cut through the board, and the double scoring makes it easier to bend the cardboard tightly around your intended Christmas gift.

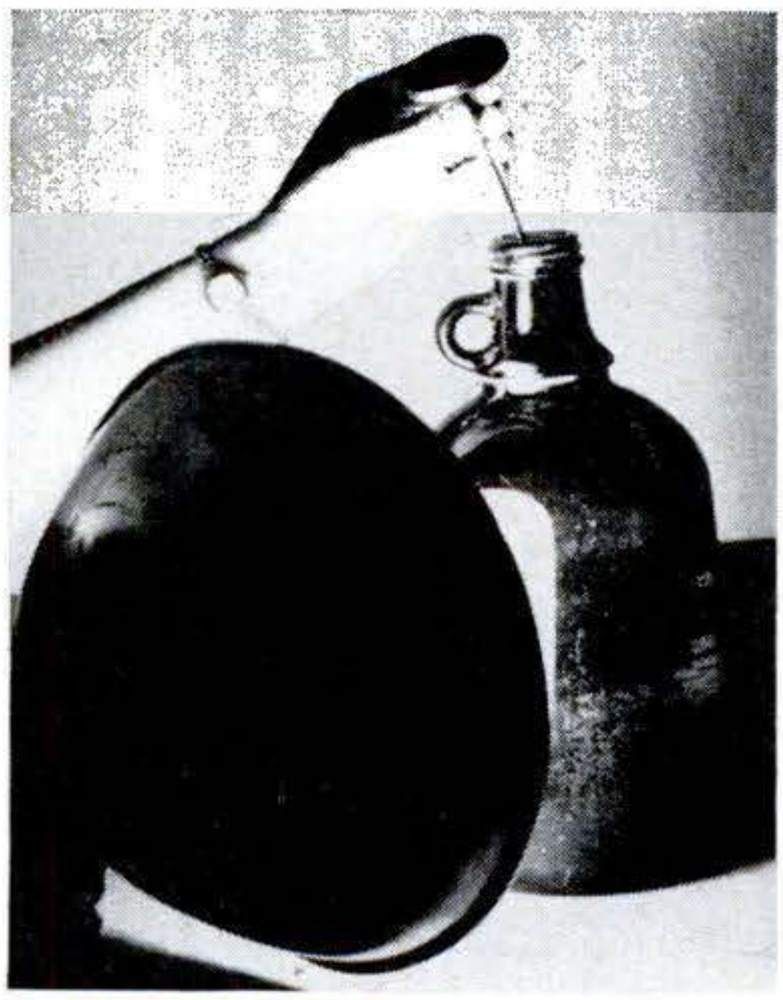


HIGH CHAIR a baby trap? If Junior tends to slip down and clout his chin on the tray, skidproof the footrest by cementing slit garden hose to its edge.

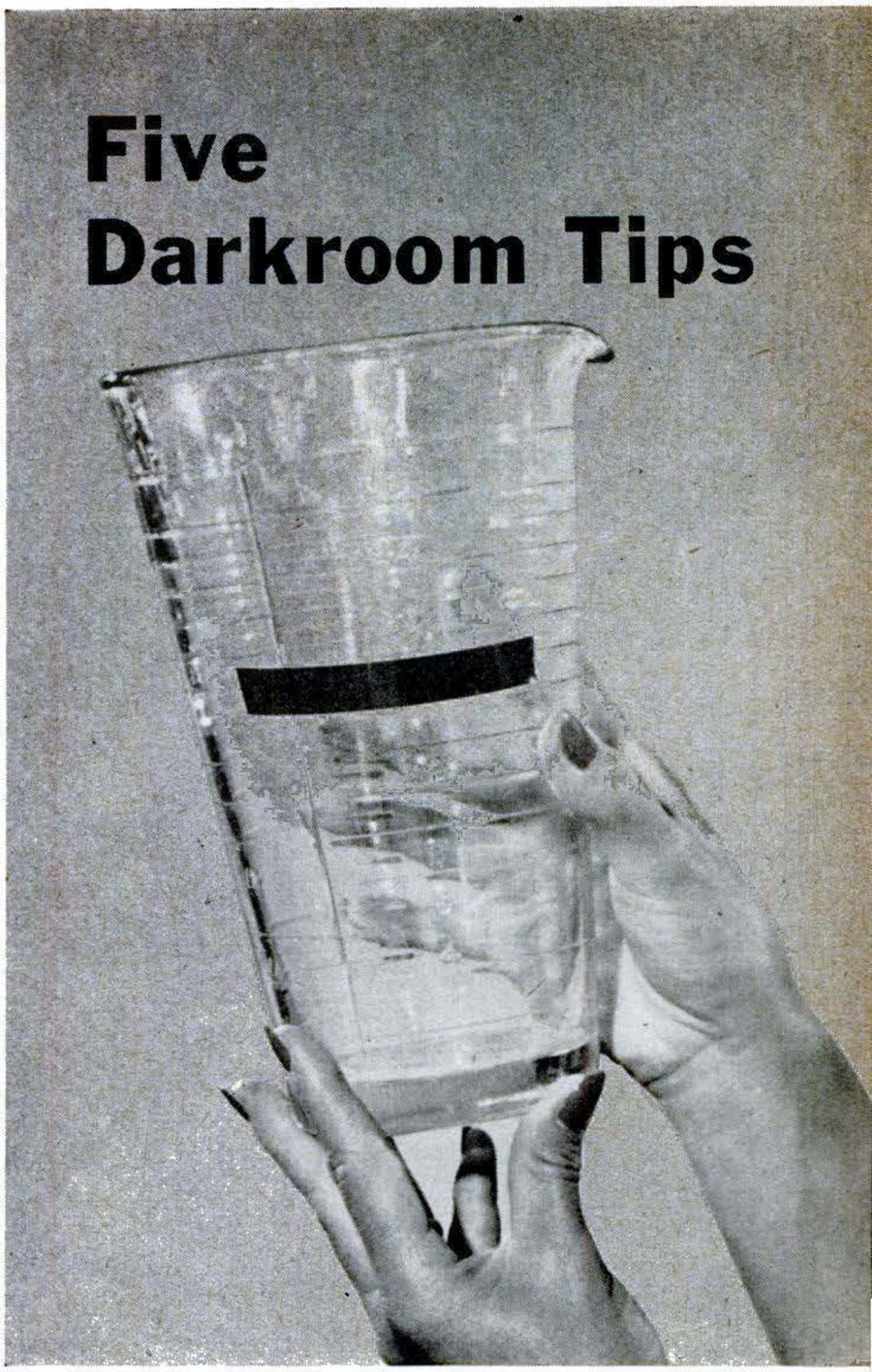
Copyrighted material

Five Darkroom Tips

1 PROTECT PRIZE PRINTS by spraying them with the clear plastic now sold in pressurized cans.



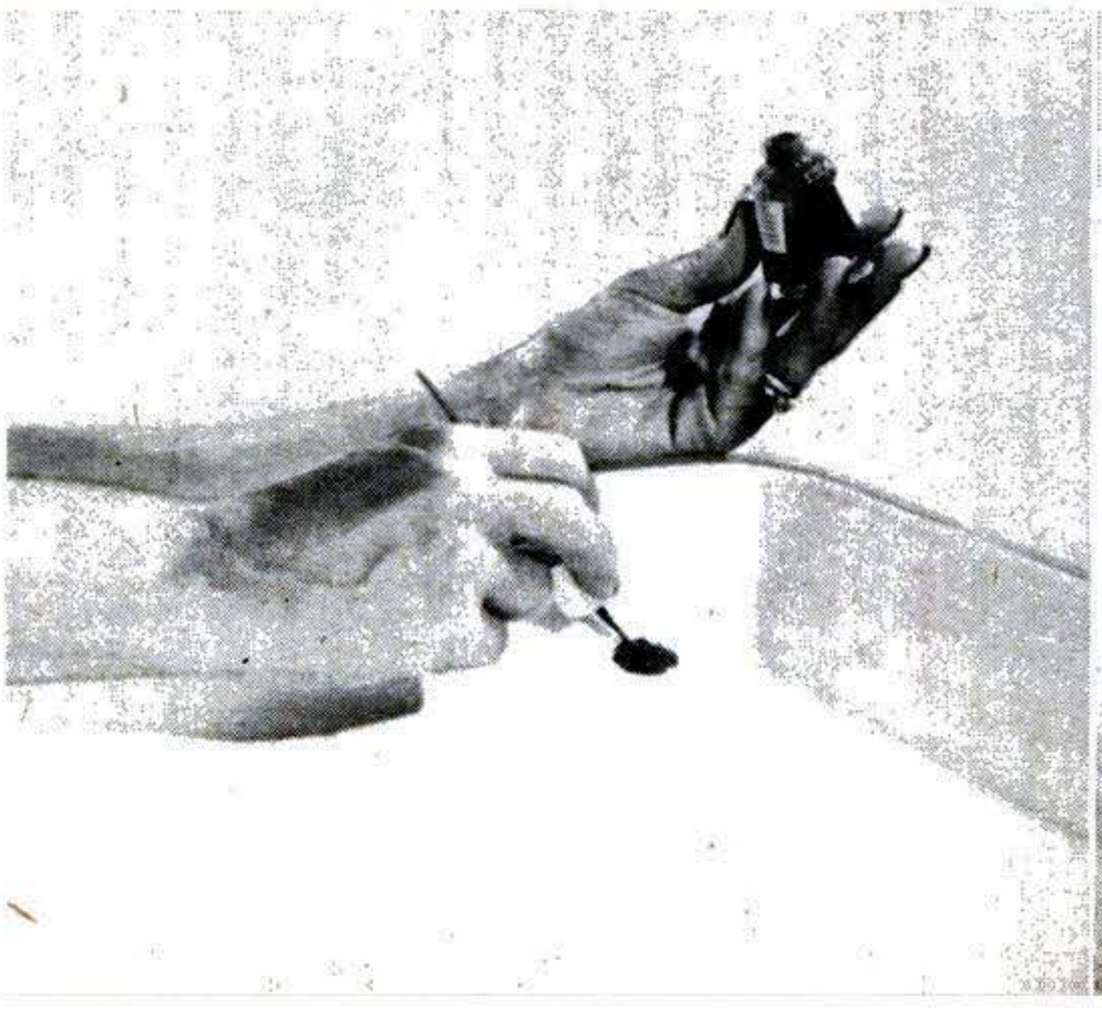
2 PUT THE HEAT ON developer on cold days with a photoflood lamp. It will raise the temperature very quickly to the desired 68°.

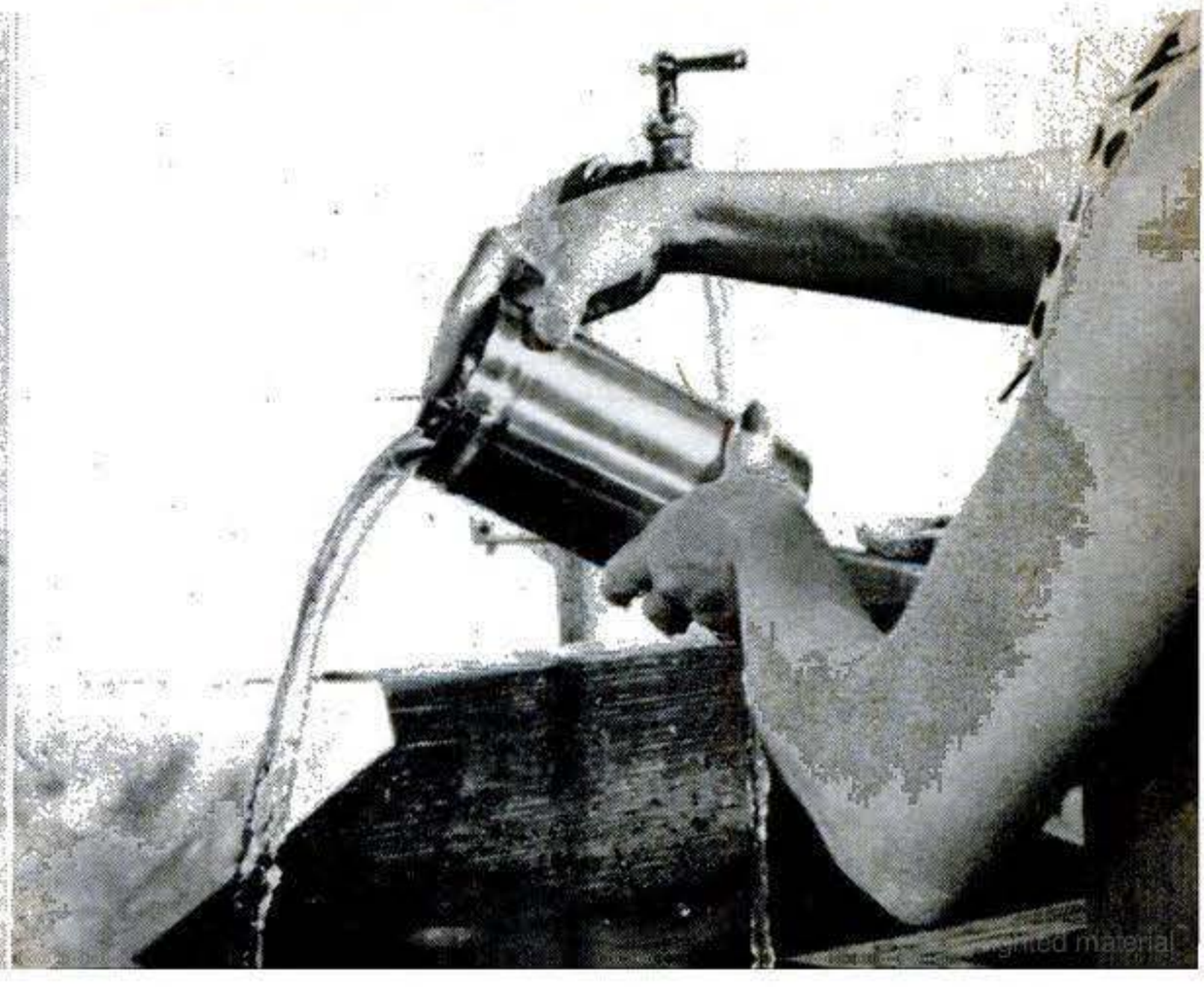


3 A MARKER placed at the most frequently used level on a graduate will help speed up measurements. A piece of colored cellulose tape stuck in place will do the trick.

4 A CHIP OFF THAT OLD TRAY will soon lead to a leak unless the spot without enamel is protected from the chemical action of the solutions. An easy repair can be made by painting the spot with fingernail polish. It dries fast.

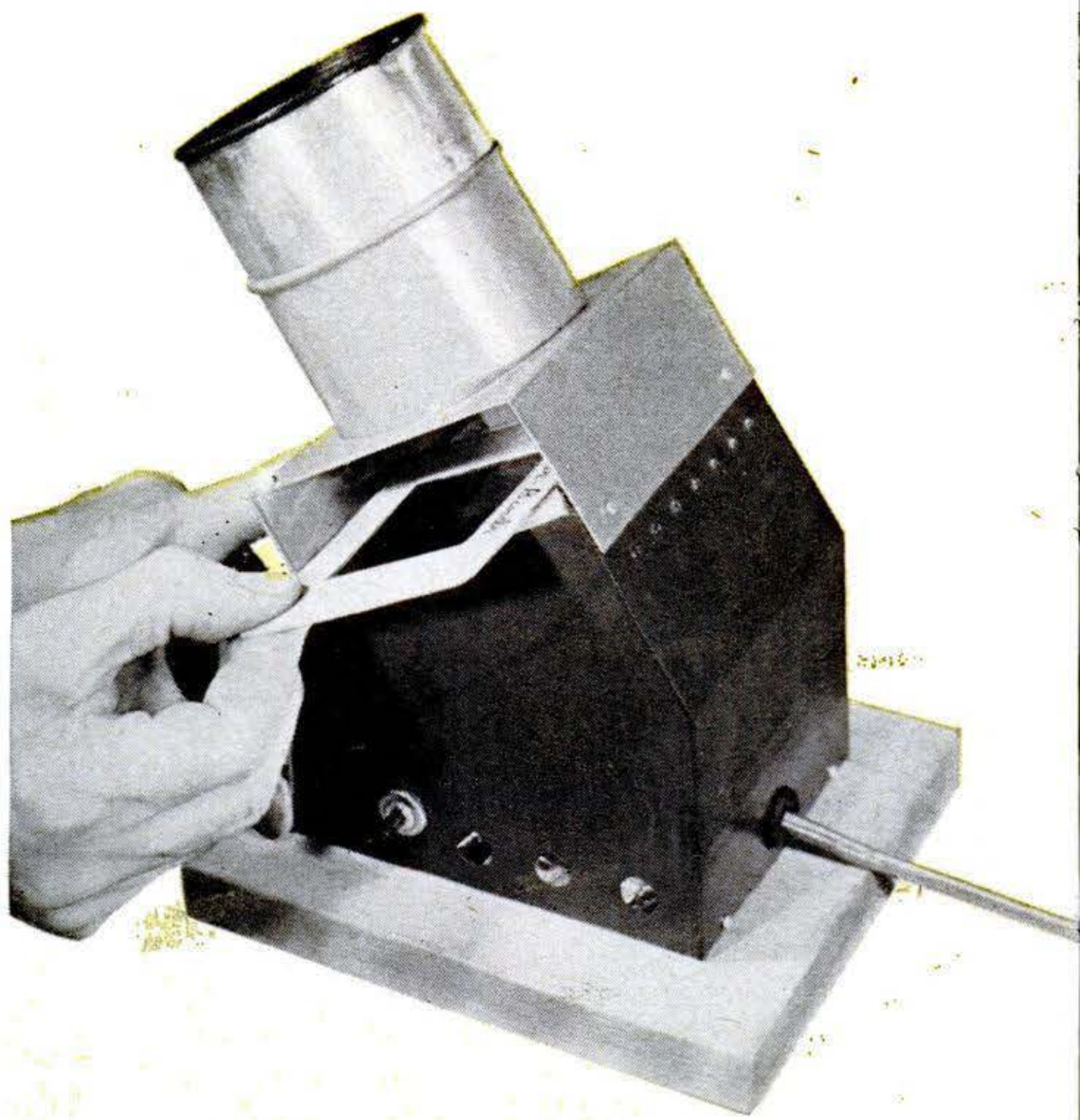
5 WASHING TIME for film can be safely shortened if you dump the water from the tank and fill it again several times before leaving it under the running water. Nearly all the hypo is removed in the first few seconds.





Digitized material

Slide Viewer Made From Cans



By Walter E. Burton

KEEP a ruler in the kitchen, measure the assortment of cans that pass through the can opener, and you'll soon have the tin for this color-slide viewer.

Designed around a 50-cent magnifying lens from a mail-order salvage house, the viewer takes all color transparencies up to 2¼″ by 2¼″ in size.

Lamp house. Cut the parts from a large juice can, allowing ⅛″ extra around each part for the tabs that join them and for rolling to eliminate sharp edges. Solder the parts together.

Use a 15-watt frosted bulb in a standard surface-mounting socket. Bend a piece of tin to a 30° angle and solder it inside the housing to support the socket. Press a rubber grommet in a hole for the lamp cord and wire it through a small canopy switch fastened in the side of the housing. Install a 3⅝″-by-3⅞″ piece of opal glass with its white surface down. Bend the tin a bit to make it snap into position easily.

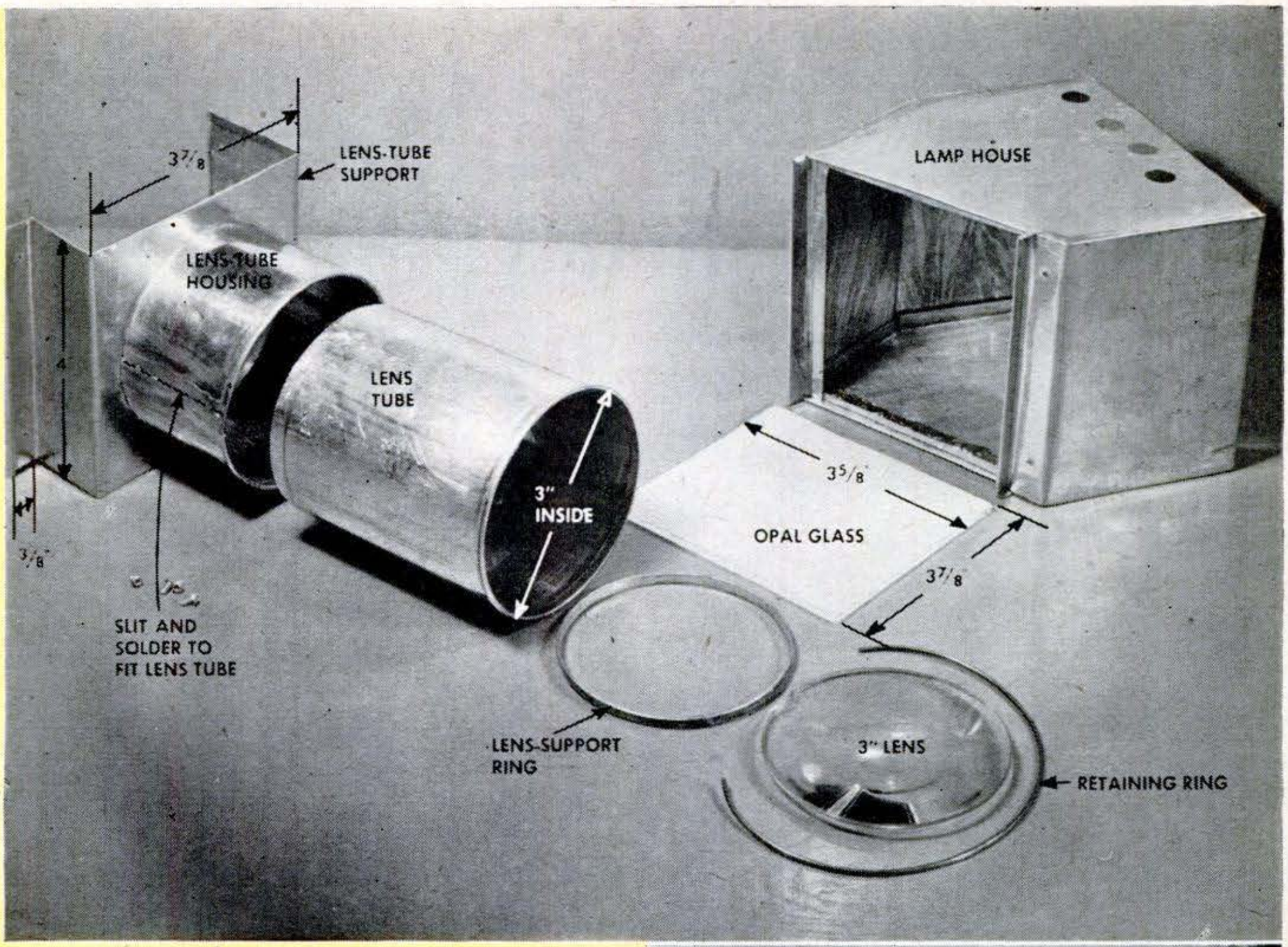
Cut the lens-tube support from flat tin and bend all edges over ⅛″. Bend it to shape and cut a 3⅛″ hole to receive the lens-tube housing.

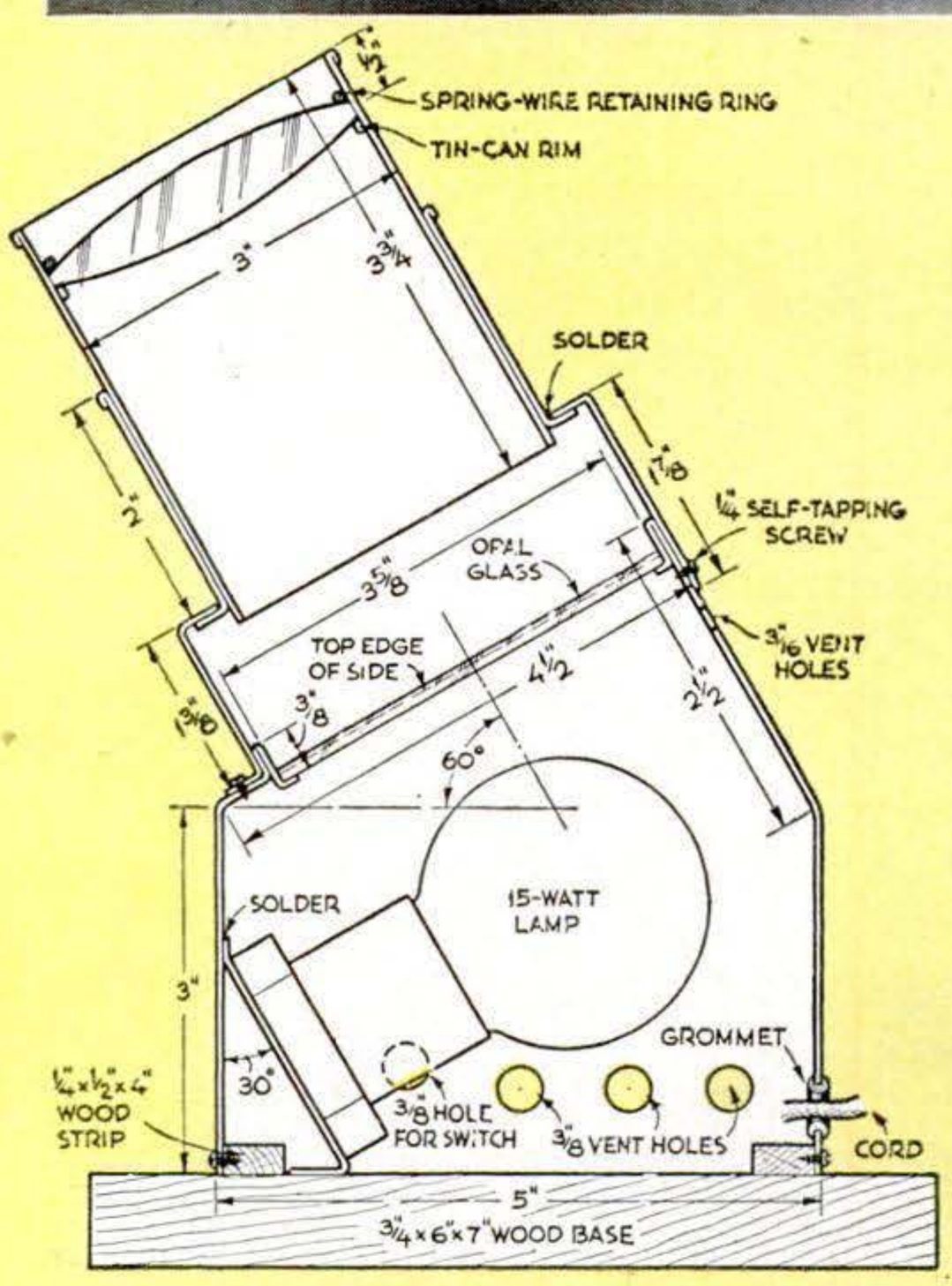
Lens tube. Here's why you need a ruler in the kitchen. The can that holds the lens must be 3″ inside diameter. With the bottom lip removed, it must slide easily inside another only a trifle larger. If you can't find such a happy combination, slit the outer can lengthwise, overlap it until it fits over the lens-tube can and solder the seam. Then make a series of cuts around the bottom of the can, bend the tabs over and solder them to the lens-tube support (see picture at far right). Punch four holes in the support and fasten it to the lamp house with ¼″ self-tapping screws.

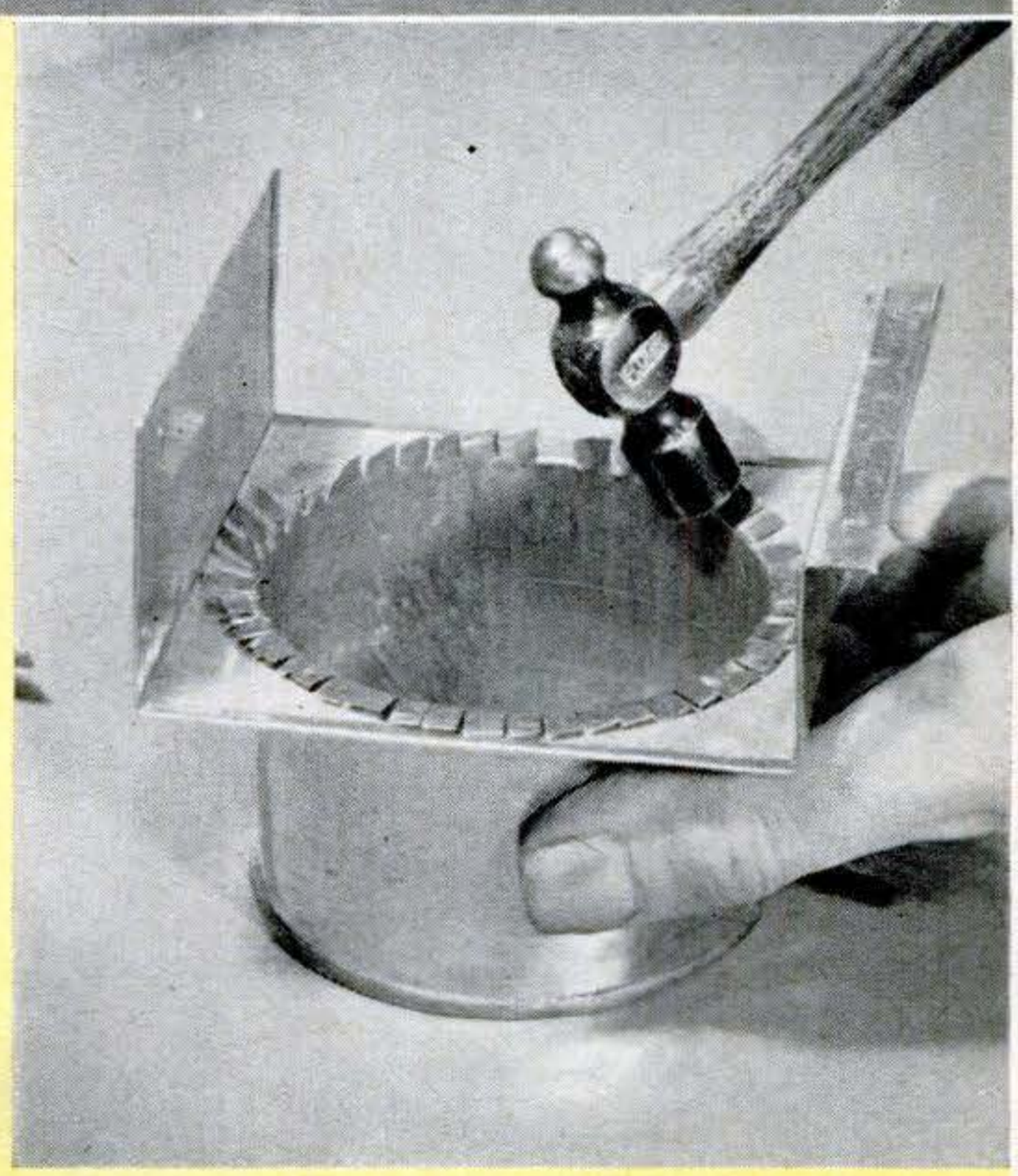
Lens. Shop the surplus and salvage shops for a 3″-diameter magnifying lens of about 7″ focal length (mail-order dealers stock them). Such a lens will magnify a transparency about 1½ times, and is just right for 2¼″-by-2¼″ slides. For smaller slides, you could use a 2½″-diameter lens of 6″ focal length in a shorter 2½″-diameter can. Solder a ring of metal (a can rim) to the inside of the lens tube about ½″ from the top. Rest the lens on it and snap a ring of spring-brass wire inside the can above the lens to hold it in place.

Enamel the entire viewer except the outside of the lens tube, which must slide for focusing. Paint the inside of the lens

Copyrighted material







CUT SLITS, 1/4" deep, around bottom of lens-tube housing, bend tabs over on underside of support and flow some solder over them.

tube dull black to eliminate reflections. Mount the viewer on a wood base about 3/4" by 6" by 7".

When viewing slides smaller than the 2 1/4"-by-2 1/4" size, you can center them under the lens by resting the bottom edges on a strip across the bottom of the opal glass. END

Copyrighted material

When your old picture tube goes dead, try reviving it before you install a new one.

TV Picture Tubes Have Nine Lives

By Art Margolis

AS A TV trouble-shooter I'm never sure what I'll find on a call. But I *am* sure of one thing. You don't always have to replace a picture tube when it starts to misbehave; it can often be revived.

The day that I was called to look at a baby-sitting TV set is a case in point.

The call came from a dress shop in a new modern shopping center. The center has a free baby-sitting service in the largest store. While paid attendants watch the children, a TV camera pans the play area. The picture is carried over a closed circuit to monitor sets in all adjoining stores.

Young mothers love the closed-circuit TV setup. They can shop in any of a dozen stores and still keep a watchful eye on their kids in the shopping-center play area.

The owner of the dress shop was practically frantic. His monitor, a 17-inch Philco, had lost its picture.

A quick look into the back and I had the trouble—a break in the filaments in the picture tube. These filaments are like those in a light bulb. When current is pumped through them, they get hot and start the picture tube perking.

Filaments can break either inside or outside the sealed glass. If they break inside, it's a tossup whether you can make a repair. But if they part outside, and most times they do, the picture tube can be easily fixed.

This one was typical. The open was in the pins of the plastic cap that protrudes out of the back. The repair consisted of putting the receiver on its face, heating the pins with a soldering iron and dripping a little solder onto the pins. That closed the break. The shop owner breathed a sigh of relief as the children came back into view.

Not all dead picture tubes can be revived this easily. In fact, many are dead for keeps. But the potential savings make the effort worthwhile. Replacing a tube averages $45. Reviving one may run around $10, including the serviceman's charge.

Let me tell you about some other near tube fatalities—and what caused them.

Art Margolis' anecdotes about his adventures as a TV serviceman are both entertaining and informative, a rare combination in electronics writing. Trained at Temple University, he now at 30 has eight years' practical TV experience behind him, six of those years as his own boss. Customers keep him mighty busy, but he still finds time to write articles for PSM (five in the last year and a half) despite two lusty youngsters who, he says, "have a pact to start yelling every time I sit down to write."

Copyrighted material

THE CALL CAME FROM A DRESS SHOP in a modern shopping center. The owner of the shop was practically frantic. His monitor, a 17-inch Philco, had lost its picture.

Low Emission

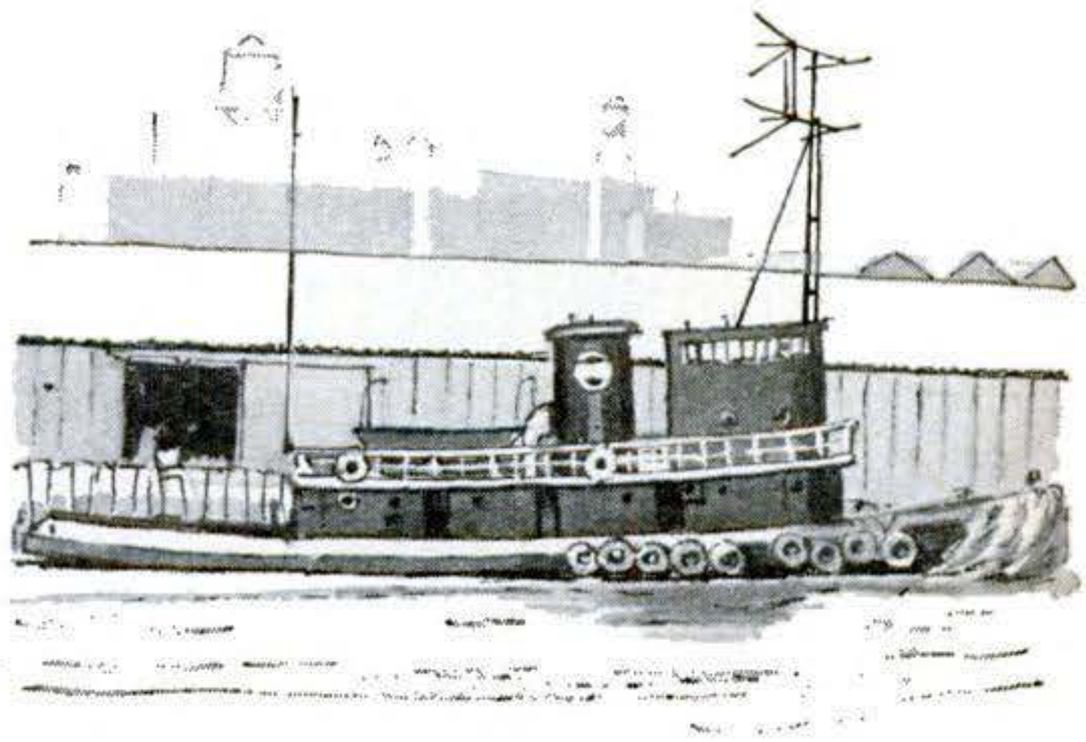
ONE of the most common defects of picture tubes is called low emission. The heat produced by the filaments warms the cathode, which is coated with barium oxide. When barium oxide is heated, it can shoot out a beam of electricity. This beam lights up the picture.

Over a period of time the outermost layers of the barium oxide become poisoned from tiny amounts of gases that float around in every picture tube. Without full aid of the oxides the cathode ray loses its intensity and the picture loses its brightness. That's low emission.

I received a call one day from Pier 10. A 21-inch RCA on a tugboat was suffering from an acute case of low emission. Only at night could any picture be seen.

A couple of years ago I would have had to put in a new picture tube. But not today. For while the surface of the barium oxide was wasted away, the under layers were like new.

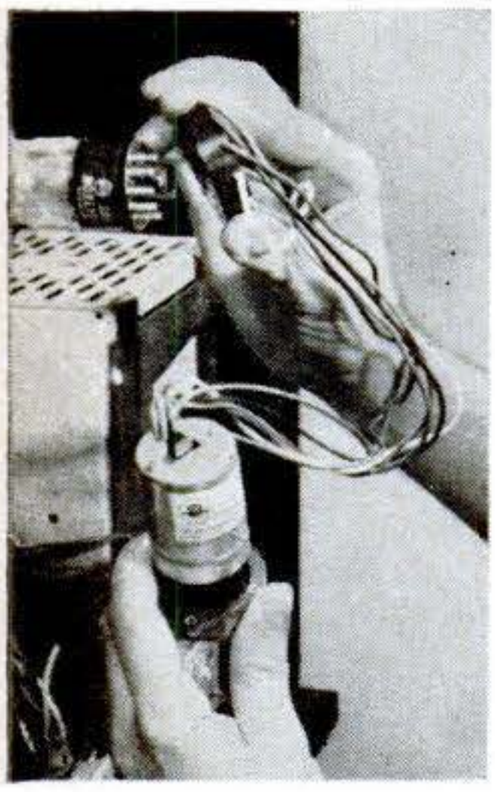
I pulled the cap off the picture tube and installed a special filament trans-



Copyrighted material

former between cap and tube. This raised the filament voltage 25 percent. That raised the heat of the filaments, the cathode got hotter, the barium oxide reshuffled its layers and the cathode ray once more struck out hard and crisp. The result was a perfect picture. This little transformer is on the market. Ask for a cathode-ray-tube booster transformer.*

The one shown in the accompanying photo has a high-low switch on it. A moderately weak tube can be brought to life with the switch in low. Later when the emission drops with further aging, you flip the switch to high—and replacement of the tube is again deferred.



Everyone asks whether this treatment won't hurt the filaments. The answer is no. All cathode-ray-tube filaments are rated at least 100 percent above their normal operating voltage. The little transformer raises it a mere 25 percent. Eventually, of course, after enough years have elapsed all of the barium oxide will become poisoned, but the resuscitation procedure really stalls replacements. The tugboat call occurred two years ago and the captain's tube is still going strong.

Filament-to-Cathode Short

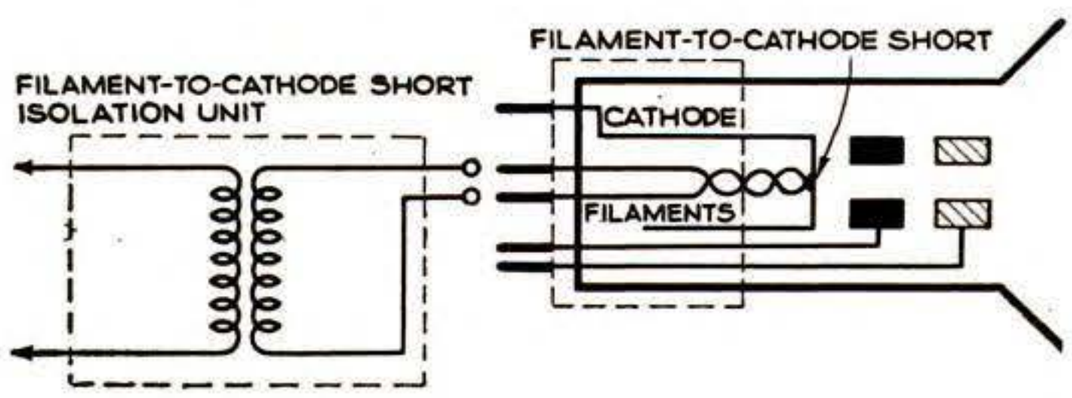
A COUPLE of months ago, a customer turned out to be my captain from Armed Service days, a chap for whom I harbor no love—to put it mildly. He was still in uniform.

He owned a 16-inch Emerson. His picture was too bright. He couldn't turn it down and the video detail was all washed out. I diagnosed it as a short between the filaments and the cathode of the picture tube.

In the crackling voice I remembered so well, the captain ordered me to change it. I informed him politely that he was

wrong. It didn't require replacement. It could be repaired. All I received for the explanation was a snort.

The only reason a cathode-to-filament short is bad in a picture tube is that the two elements are electrically fed from two different circuits that must never be joined. If the filament does manage to touch the cathode, it can be fixed by simply isolating one circuit from another and leaving the short be.

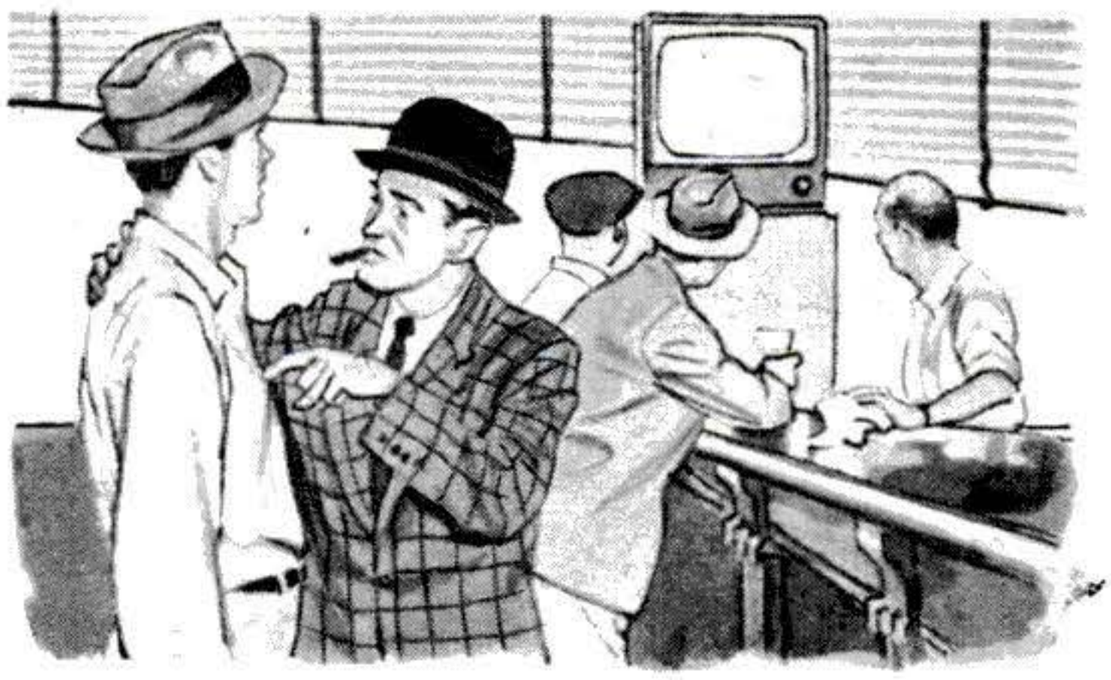


There is a little 1:1 transformer unit on the market that can isolate the filament circuit from the cathode circuit.* Called a cathode-ray-tube booster (isolation type), it looks like the filament boost unit and is installed in exactly the same way. I ignored the professional soldier's command to replace the picture tube and installed one of these little isolation jobs. The picture snapped back into gorgeous splendor.

My ex-captain didn't say anything. He just paid his bill and looked annoyed. But I guess he's not so bad, after all. In a short time I was flooded with TV service work from the nearby base.

**Supply shops that sell radio and television tubes will also sell you these transformers, or you can order from such mail-order houses as Allied Radio, 100 N. Western, Chicago; or Lafayette Radio, 100 Sixth Ave., NYC. The CRT booster transformer shown in the photo is made by Chicago Standard Transformer Corp., 3580 N. Elston, Chicago.*

Copyrighted material



Cathode-to-Control-Grid Short

I FOUND another type of defunct picture tube in a tense situation. A 24-inch Westinghouse setting high on a taproom shelf had gone off duty. The screen was almost dark. Only very faint movement could be seen. The feature horse race from the local track was to start in about 20 minutes. A dark-haired bookie told me anxiously, "You get that thing working by post time and you got yourself a beautiful tip."

The trouble proved to be a cathode-to-grid short in the big tube. When the cathode ray leaves the cathode it passes through another element called the control grid. This grid has an electromagnetic representation of the picture issuing out of itself and puts these impulses into the cathode ray. The alterations in the cathode ray cause light spots and dark spots on the picture tube face. This is the viewing picture. This tube was defective because the control grid was shorting against the cathode.

Unfortunately, there is no isolation unit to remedy that, but there is an almost infallible trick to separate the two elements. For the grid itself does not actually do the shorting. Some flaking occurs on all the tube elements. These flakes bridge the tiny gap between the elements and cause the short. An isolation job consists of peeling these flakes out of the spaces between the two tube elements.

Here is how it's done:

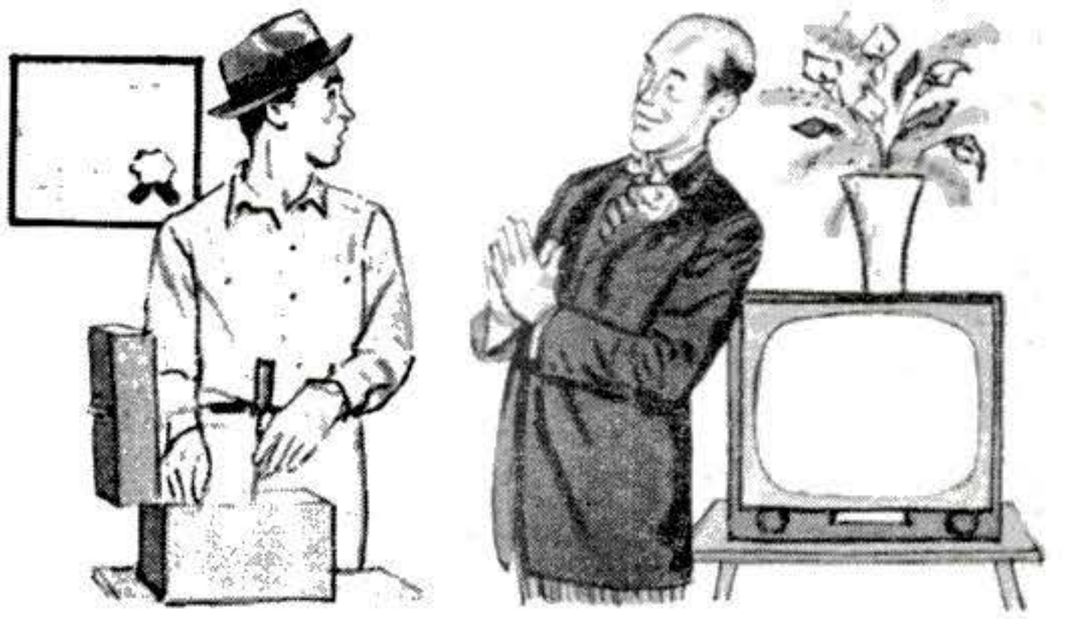
I grounded the cathode pin with a connecting wire. Then I connected another lead to the plate of the horizontal output tube, which carries a 4,000-volt RF voltage. Taking the 4,000-volt probe, I tapped it to the control-grid pin. The 4,000 volts flew across the cathode-to-grid short. Once, twice and I was done. The RF voltage very neatly cleaned off all the flakes. The cathode-to-grid short was unshorted. The picture came on like new, sharp and crystal clear.

As I left the bar with an extra ten in my wallet, I could hear a bugle at the track blast out its TA-TAAA-TA-TA in glad fashion.

There are other ways in which a picture tube may go dead. Any of the grids or the cathode can open just as the filaments did in the dress shop. But they usually open between the plastic cap and the outside of the glass envelope. Here, too, the dripping-solder method will effect the repair.

There can also be what is known as a control-grid-to-accelerator short. After the cathode ray leaves the control grid it comes to another element that gives it an electromagnetic shove toward the luminous face. This element is called the accelerator. In cases of control-grid-to-accelerator short, the high RF voltage will turn the trick.

Naturally, some tubes have to be replaced. A filament voltage booster won't do any good if a tube is too far gone. Sometimes a short in the elements is welded tight and nothing helps. But these jobs are in the minority.



Open Element Inside the Glass

THE last and rarest type of cathode-ray-tube failure is ticklish to fix and has less than a 50-50 chance of success. I've run into only a few of them. One job in particular sticks in my mind because the set owner's thanks came in

Copyrighted material

such an unexpected—and unwanted—way.

I walked in on this job and found a bad picture tube in a 19-inch Admiral. There was good brightness on the screen but no video. I diagnosed the trouble as an open control grid. But instead of being outside the sealed glass, the break was inside the vacuumed envelope.

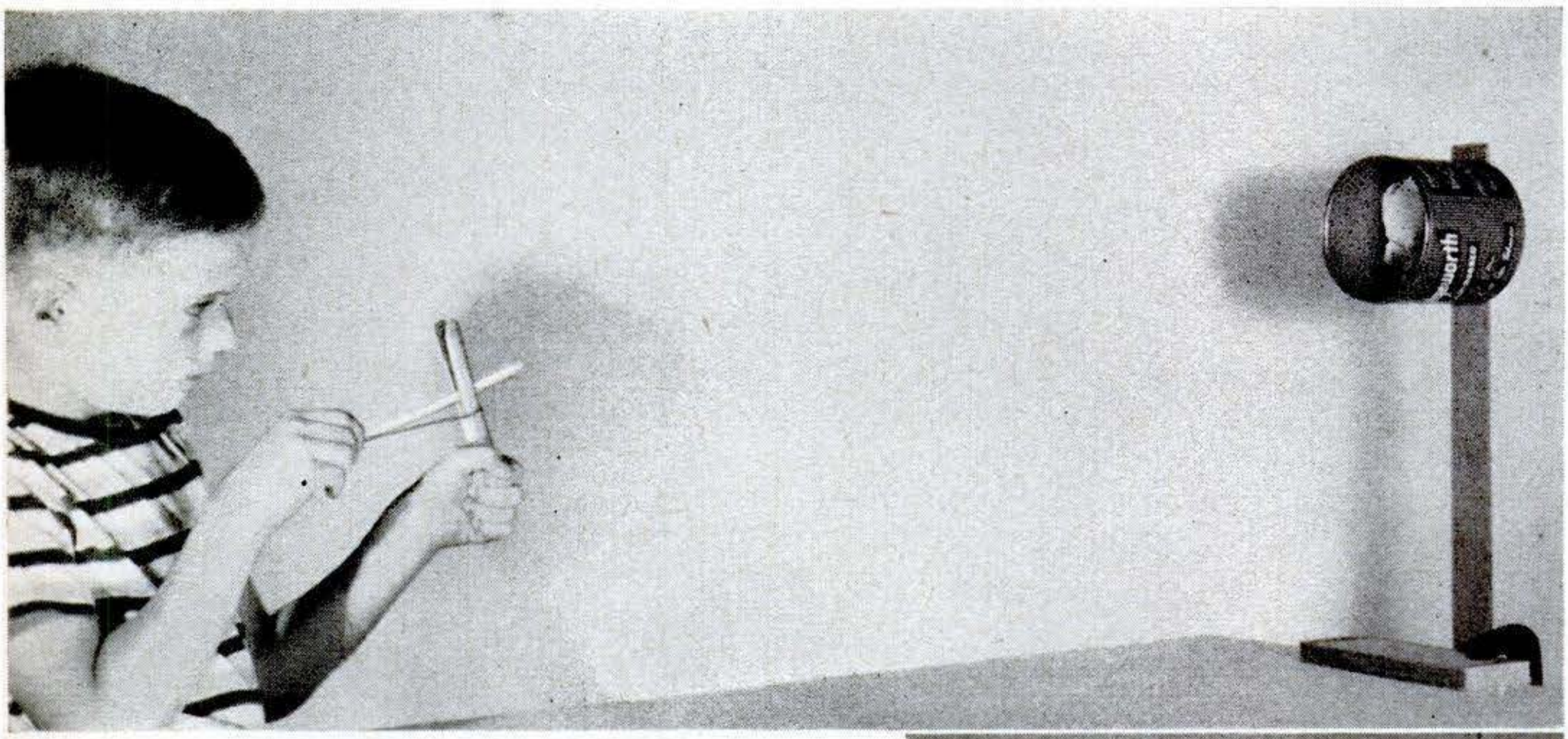
Service companies have a special instrument now called a picture-tube fixer. I hooked mine up to the bad cathode-ray tube and turned it on. The first thing the machine did was heat up the metal structures in the tube. Then when they were good and hot I pressed a button and an RF voltage shot through the elements. Simultaneously I tapped steadily on the CRT neck with a small screwdriver. Between the heat, the RF voltage and the vibration, sometimes the open parts of the element will touch. If they do, all of the energy going on welds them together once more. Sometimes it does and other times it doesn't. Luckily this time it did. The tube was resurrected. The picture came back on beautifully.

My client's eyes shone with delight. He clasped his hands together and told me in sonorous tones, "I am very pleased with the repair. If I can ever take care of you in the future I will be very happy to do so." He's a nice guy. I have nothing against him at all. But you know what he is? He's an undertaker. END

HINT TO AN UNHANDY HANDY MAN

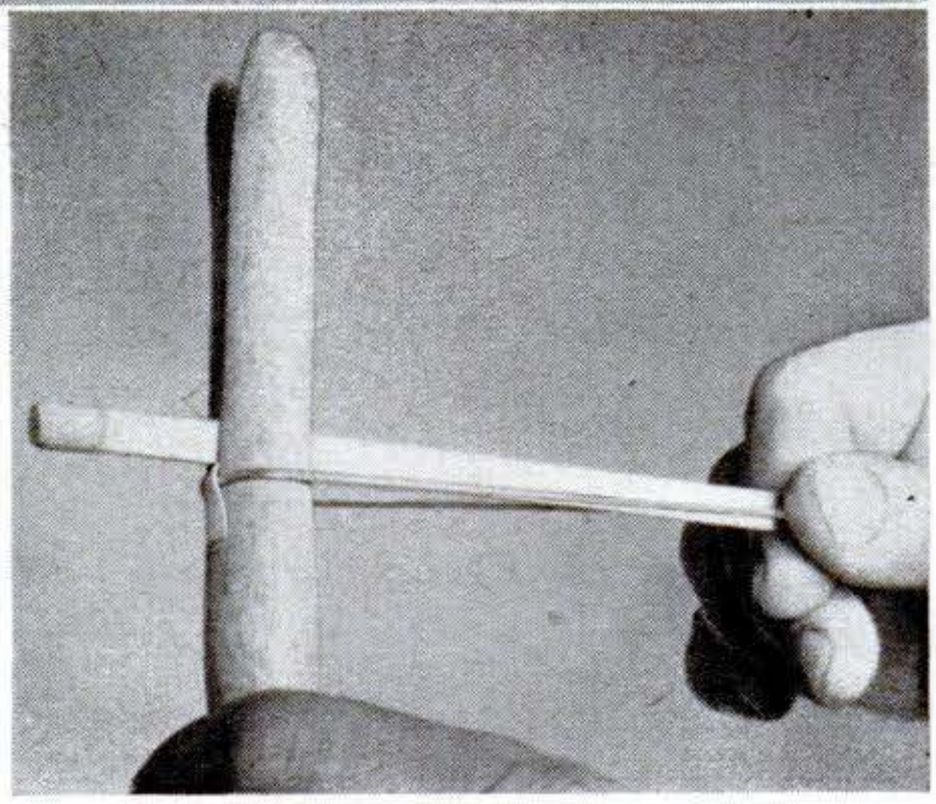
It's a phrase often said
But forgotten by some:
"Hit the nail on the head,
Not the nail on the thumb."

—BERTON BRALEY

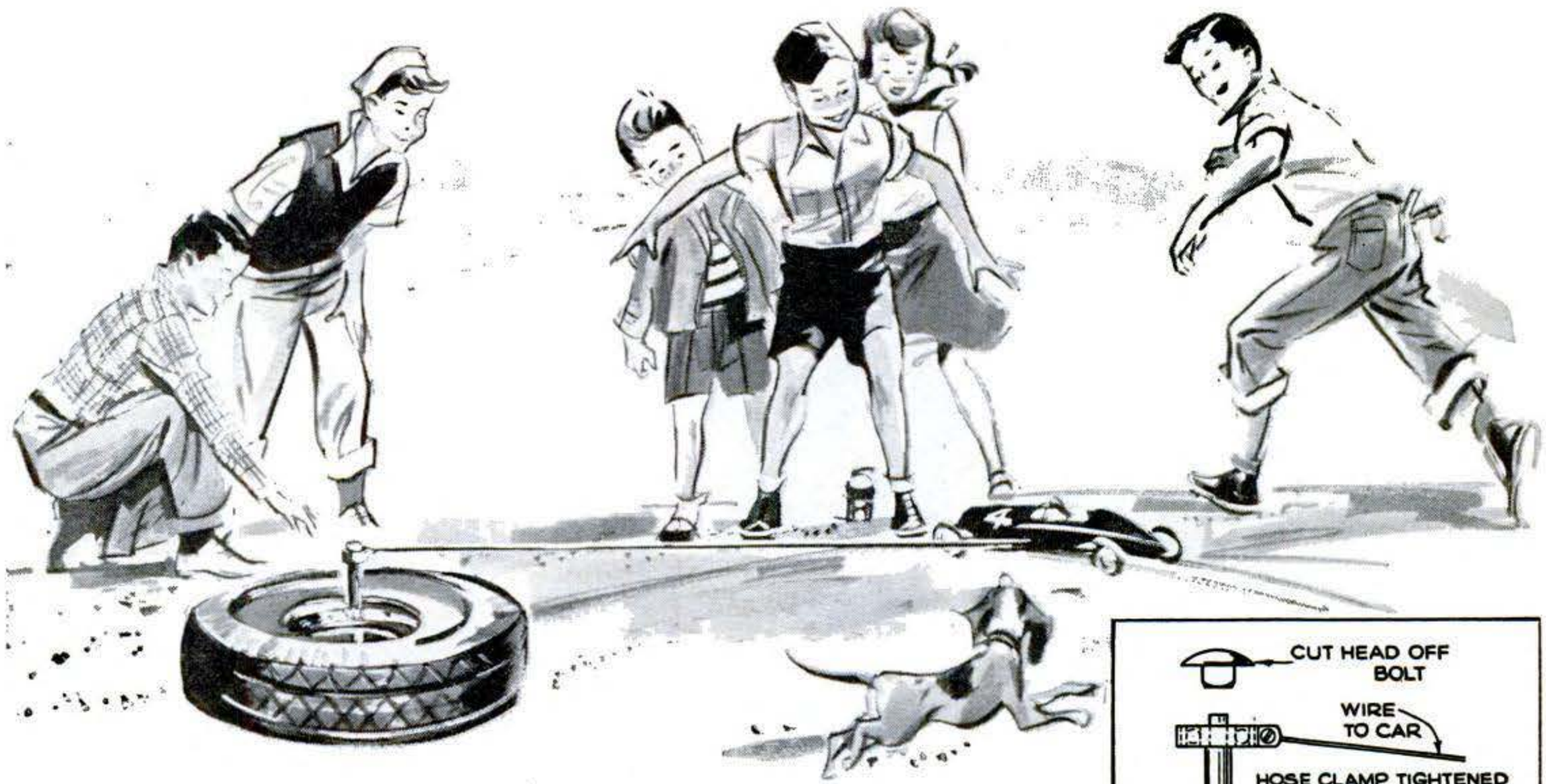


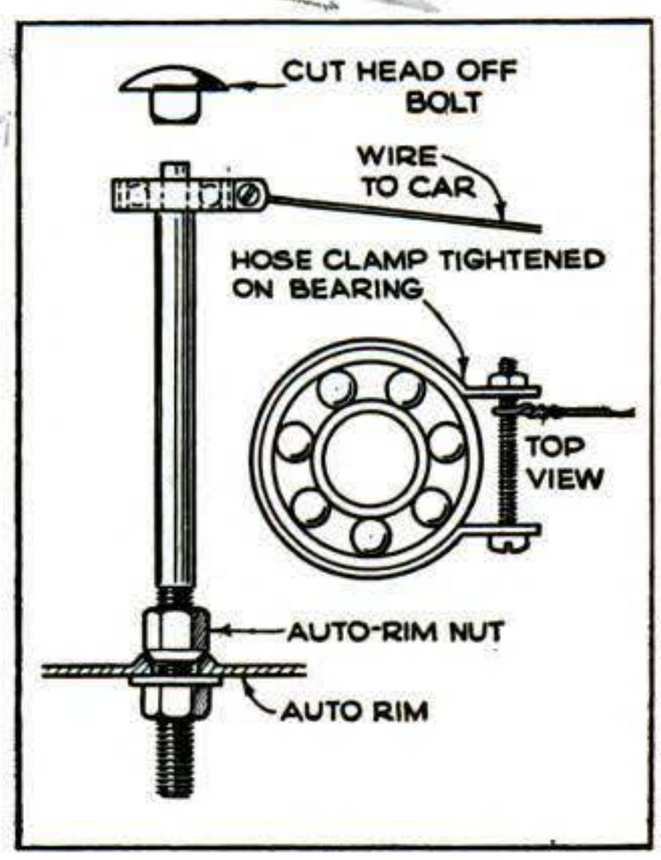
Clothespin Shoots Arrows into a Tin-Can Target

A YOUNGSTER can while away many winter or rainy-day hours with this clothespin slingshot. Tape a rubber band around the clothespin just below the crotch. Whittle arrows from splinters of wood, gluing a piece of dowel to the leading end of each as a weight to keep it straight in flight. The target is a can on a stick. A wadded cloth in the bottom of the can will keep the arrows from bouncing out.—*Sam Grant, New York City.*



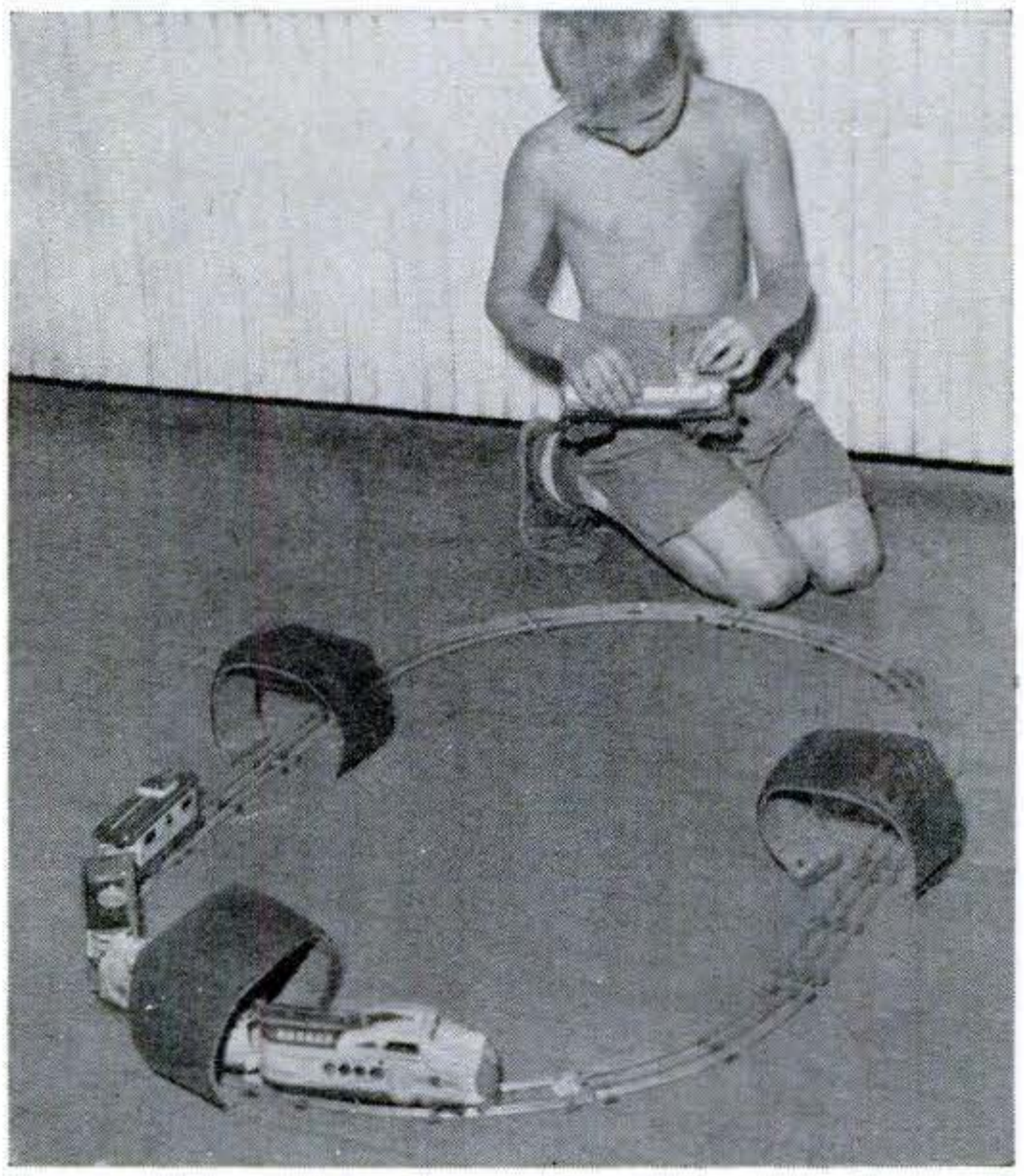
Copyrighted material





Car Wheel Serves as Kids' Race-Car Hub

YOUNGSTERS can race their model cars against time around this durable center post—a bolt secured to an old auto wheel and tire. Use a bolt about 8″ long and cut off the head. The threaded end is held by means of two nuts and washers in one of the hub's lug holes, as in the drawing at right. On the other end of the bolt, file a collar to take a non-shielded ball bearing. Then fasten a hose clamp around the bearing and attach the guy wire to the clamp and bridle of the racer.

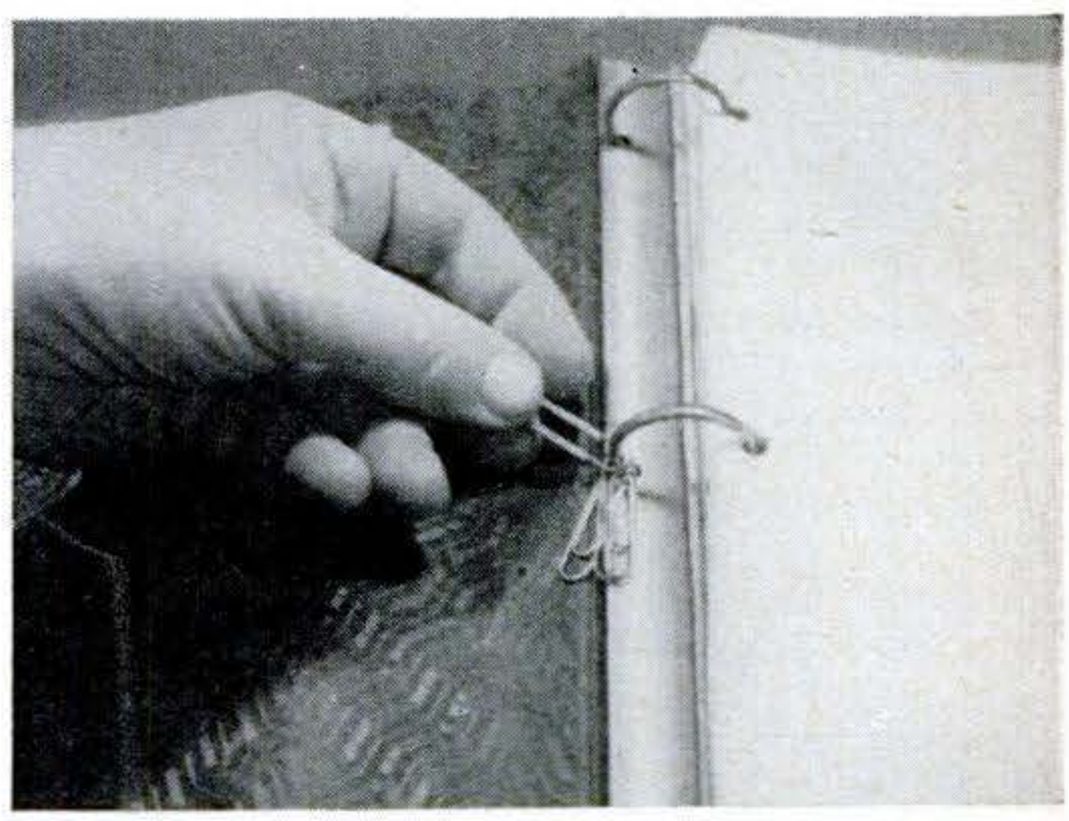


Old Tires Form Train Tunnels

A CHILD gets a big kick out of having lots of tunnels for his trains. You can cut them from a worn auto tire ready for the heap. Slice them off with a hacksaw.

Funny Picture Makes 'em Smile

HAVE trouble getting your tot to smile for the camera? Mount a funny picture at eye level on the wall behind the photographer. The child will grin every time.

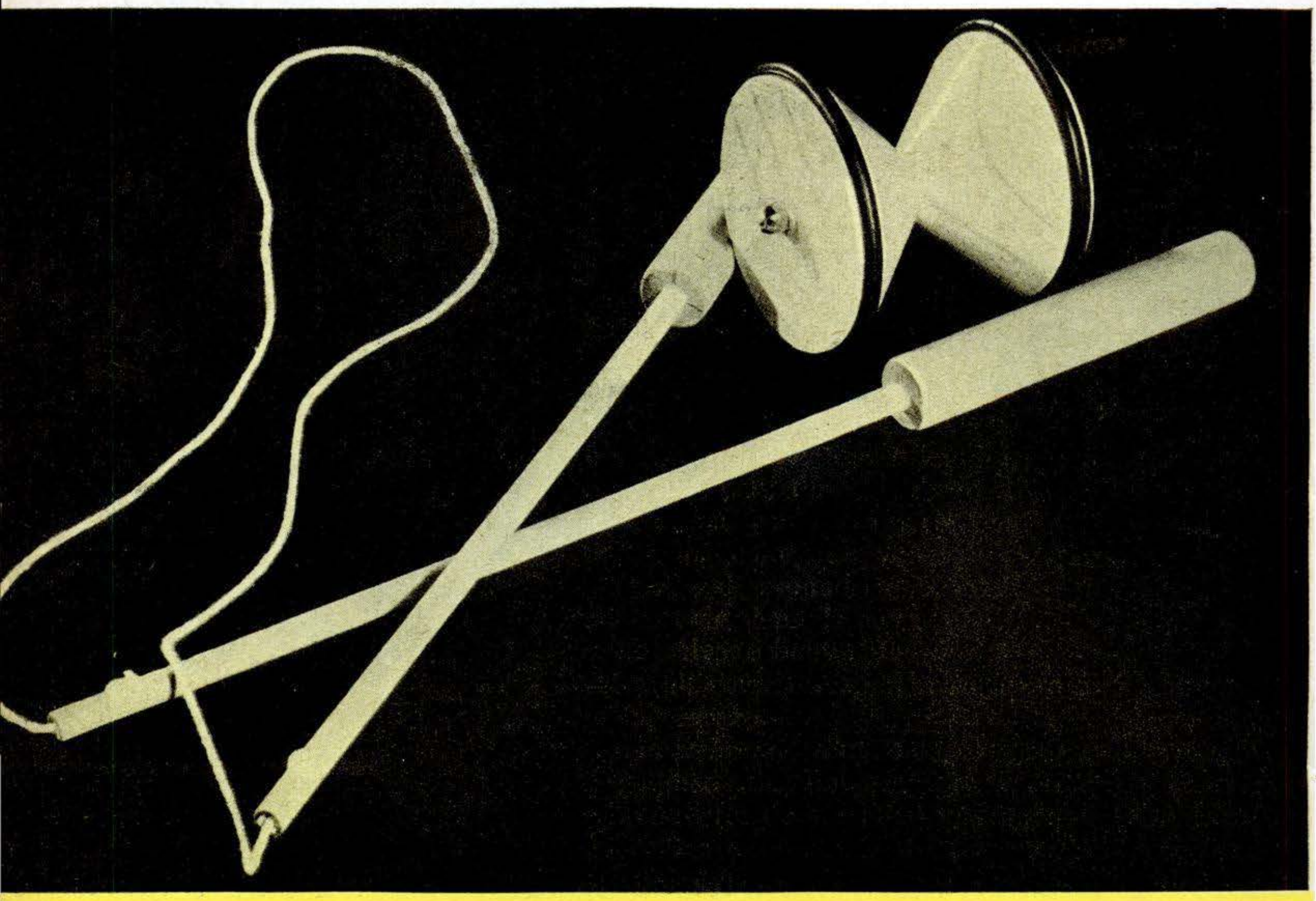


Binder Rings Hold Spare Clips

PAPER clips take up no additional space and can be kept handy if you slip them on the rings of a loose-leaf binder in which you carry school or business papers.

Copyrighted material

A Diabolo Is Fun to Make



TO SPIN THE TOP, you raise and lower the sticks alternately, with a quick backward shift of the string at the end of each rotating impulse.

When the speed is great enough to stabilize the top in flight, just whip the sticks apart to toss it into the air. As the spool comes down you catch it on a sloping string and let it roll down into slack bunched near one end.

Two diabolo twirlers can volley the spool between them; four can play a two-team game, racking points for longest volleys without a miss.

Copyrighted material

and Fly

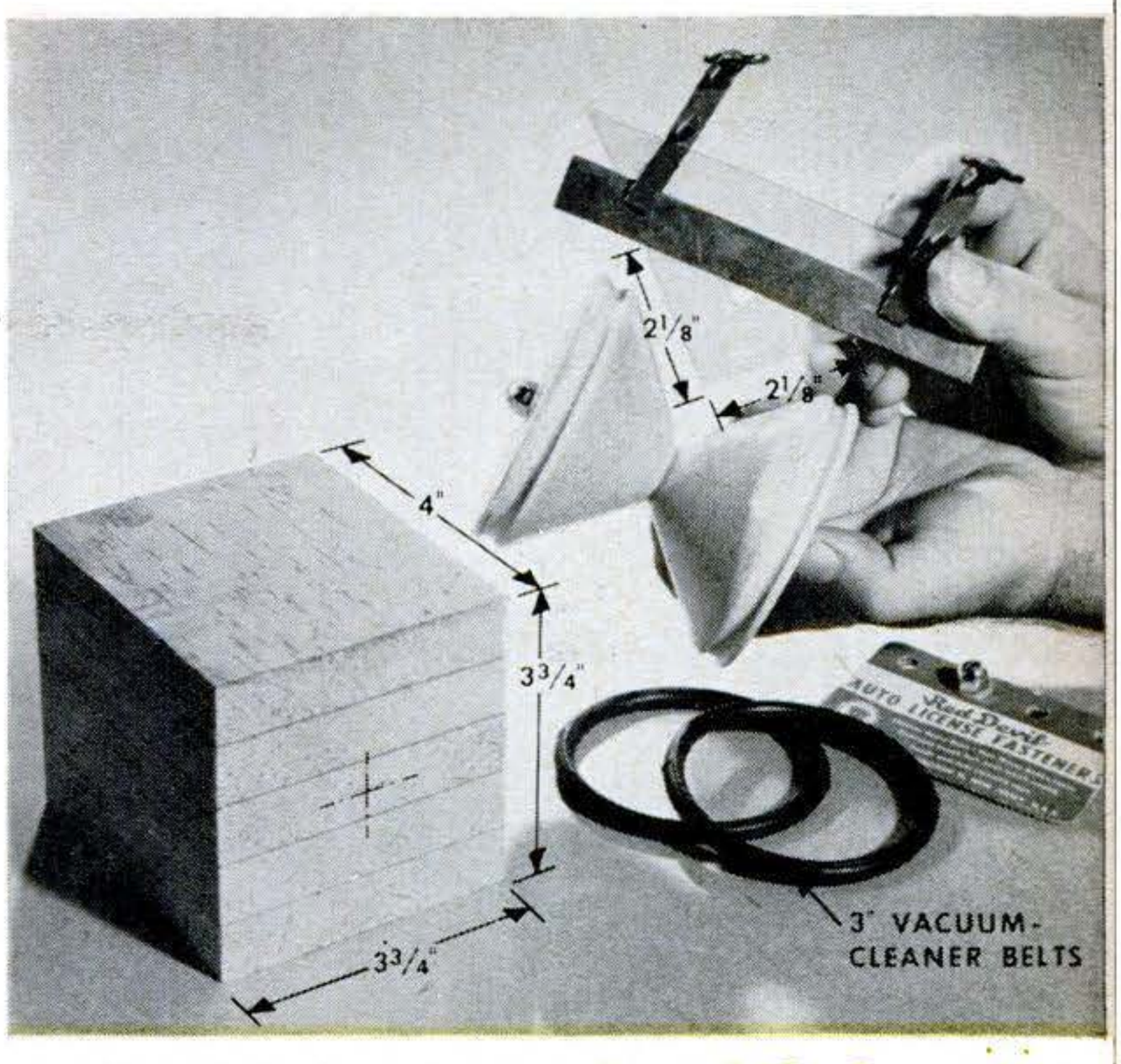
HERE is an unusual Christmas present for any youngster—a wasp-waisted diabolo top and the sticks and cord you need to spin and cast it high, wide and handsome through the air.

A game with a history, diabolo was popular with the ancient Chinese and with French sports of Napoleon's day before American youngsters turned it into a backyard fad from 1910 to 1915.

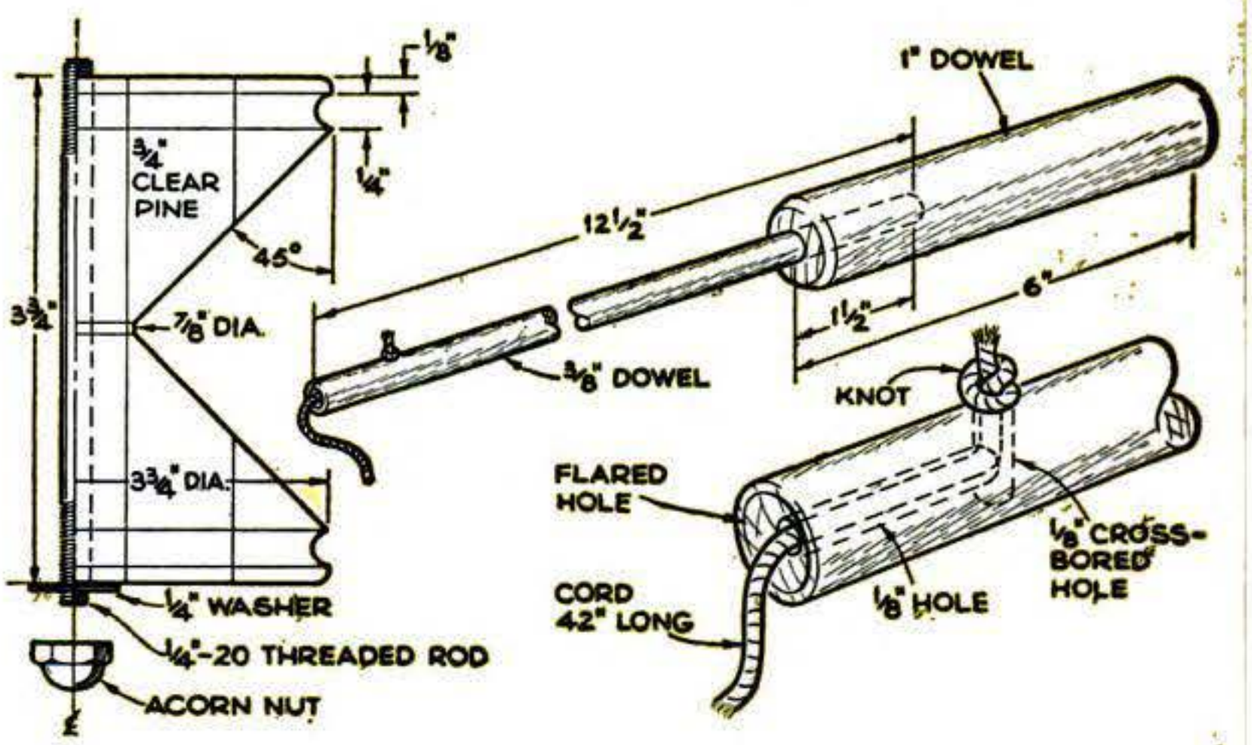
Considerably more skill is needed to twirl a diabolo top than the Yo-yo it resembles. The diabolo flies free and is caught before it falls to the ground.

The top shown here was patterned after an old-timer I found in an attic trunk. The 1956 model was made more stable by adding a balance-adjusting core, and easier on itself and indoor surroundings by placing rubber rings on the rims. These are 3″-diameter vacuum cleaner belts bought at a cleaner service shop. Acorn nuts, from a box of auto-license fasteners, cap the threaded core. To stabilize the top, you shift the threaded rod a bit to one side or the other with the nuts.

Rough out the spool with a skew chisel, finish with a V-point chisel. Face the ends close to the nuts on the mandrel. Chisel off the remainder. Glue ⅜″ dowels into 1″ dowel handles to make the sticks. Tie a 42″ length of chalk line or heavy fishline to each pair. Make at least two pairs.—*Stewart Rouse, Lewisville, Ind.*



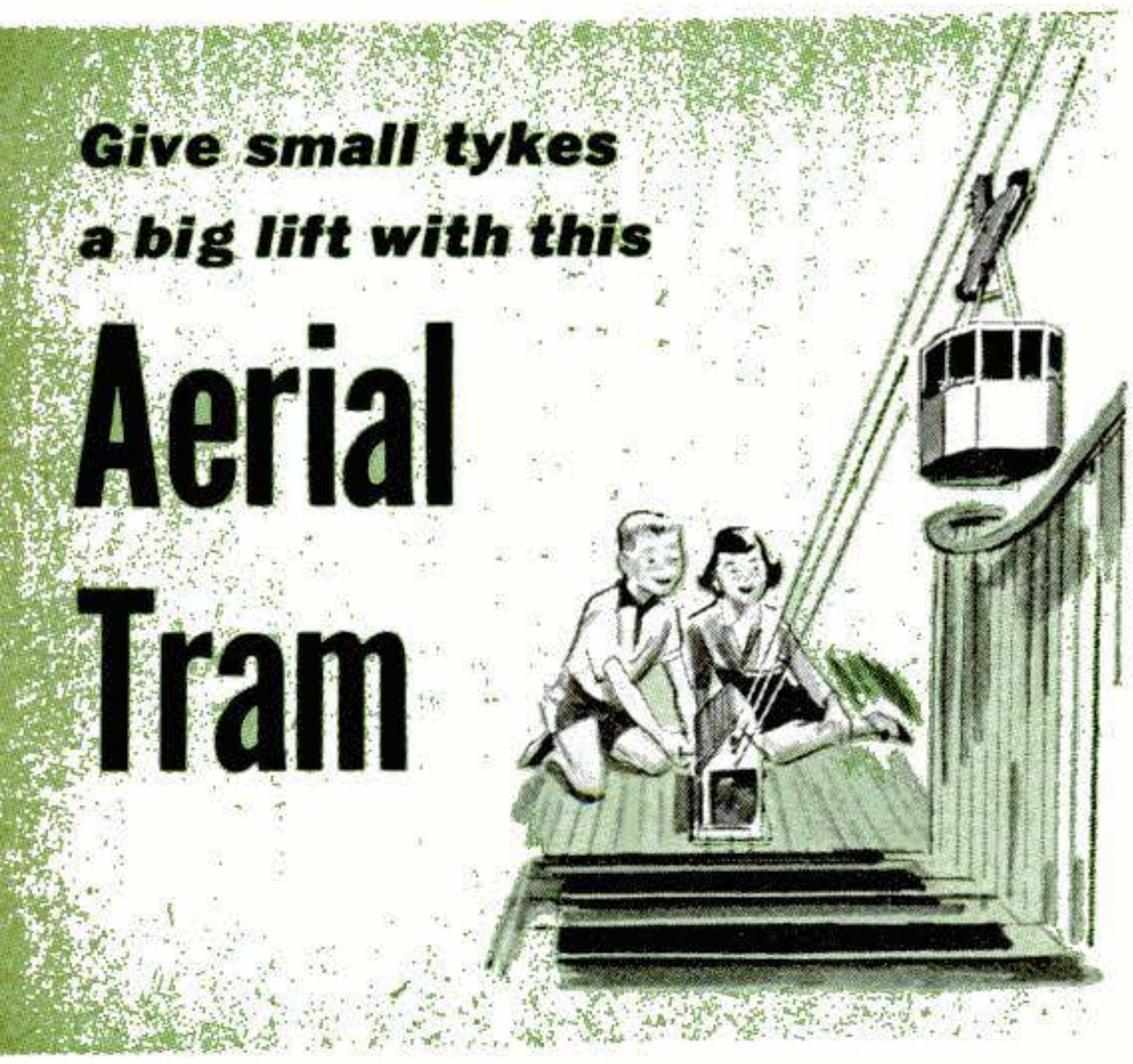
THE DIABOLO BLANK is ¾″ wood glued up as above. Drill a ¼″ hole through the center and insert a threaded rod. Lock the rod in place with nuts and washers and, using the rod as a mandrel, set the blank between lathe centers. Check the turning with a template made by clamping a steel rule across the 90° angle of a draftsman's triangle. After turning ¼″ end grooves for the vacuum cleaner belts, remove the nuts, sand off the ends of the spool and apply two coats of shellac. Shorten the rod and thread on balance-adjusting acorn nuts.



Copyrighted material

Give small tykes a big lift with this

Aerial Tram

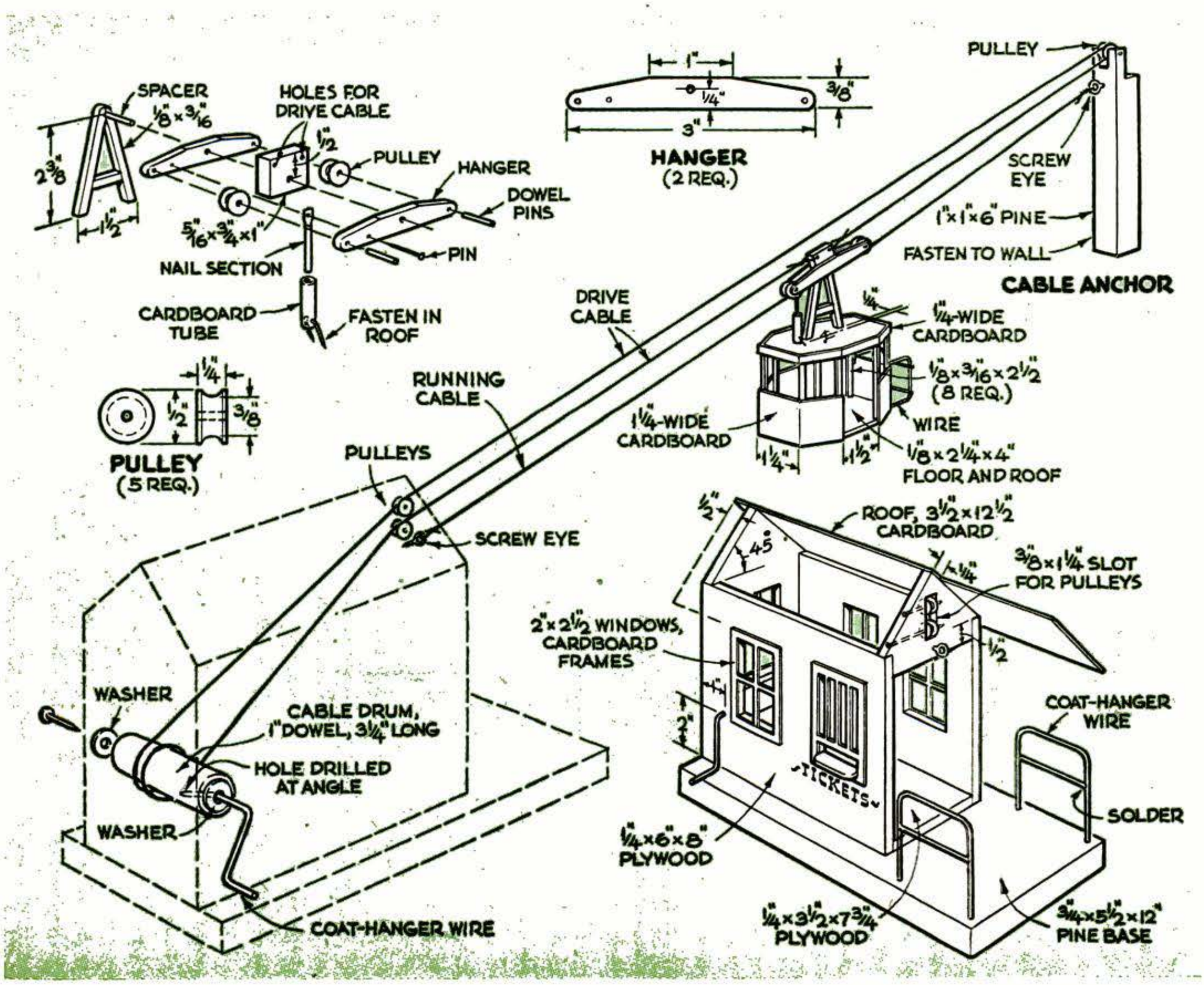


STRUNG in a stair well, this miniature aerial tram will give young operators as much of a thrill as a ride on a full-scale Swiss funicular car.

The driving mechanism is a hand-cranked drum in a winch-house made of plywood and cardboard, mounted on a heavy base to counteract cable tension.

The car, built of thin wood and Bristol board, under-rides a two-wheeled hanger, which angles with the incline of the cables. Turn the pulley wheels, along with those for the winch-house and return-cable anchor, from ½″ doweling. To keep the car from rocking as the hanger tilts, flatten one end of a 1¾″-long rod cut from a nail, and drill a hole through it so that the rod can be hung from a pin between the hanger sides. Slipped into a Bristol-board sleeve stapled to the car roof, the rod acts as a sway damper.

Suspend the car from a running cable stretched between screw eyes on the winch-house and the return-cable anchor. Wrap the drive cable around the winch and carry the two ends over the pulleys under the gable. Attach one end to the car hanger. String the other end over the pulley on the return-cable anchor and then bring it back and attach it to the hanger.—*Roy L. Clough Jr.*



Copyrighted material

Is It Noise or Music?

With simple odds and ends and a small household motor, you can amuse a child and show him how notes are born.

By Andrew Pfeiffer

EDITOR'S NOTE: Science provides a fascinating bag of tricks from which, if you are prepared, you can pluck diverting and instructive answers to that familiar child's cry, "Daddy, what'll I do now?"

The tricks are simple laboratory demonstrations of natural laws. A monthly series, of which this is the first article, will show you how to do them.

PRESSED by an inquisitive youngster to tell him what sound is made of, you need not flush and stammer. If you have an unbreakable 10″ phonograph record around the house—preferably one too scratched to bear replaying—some scrap wood, a bolt and some screws, a sheet of wrapping paper, an eye dropper and slim rubber tubing, and an electric drill press, you can appear as wise as a sage.

If the household goods do not include a drill press but do embrace an electric sewing machine, your position as local font of wisdom is still secure.

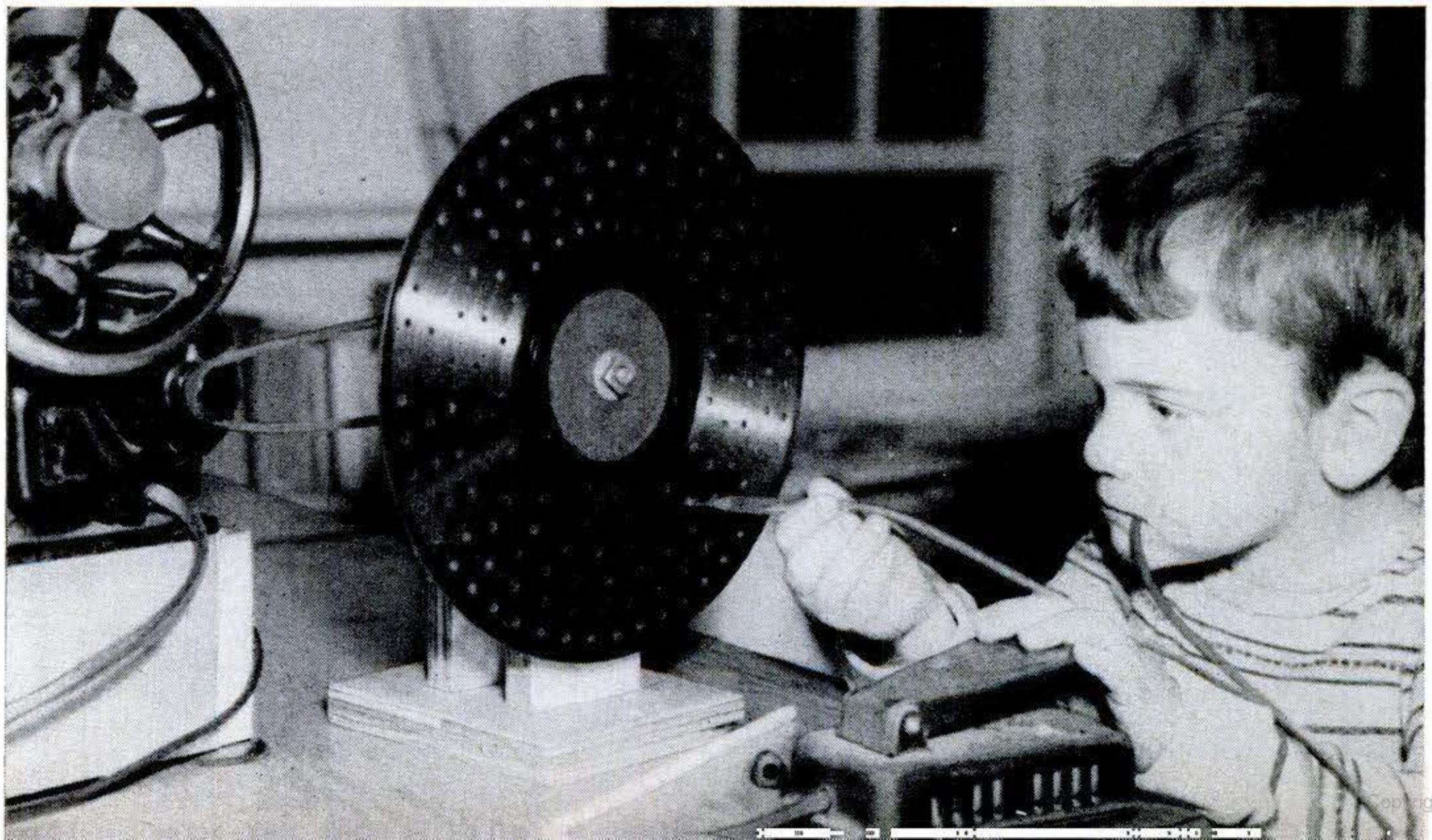
Now, it may be a commonplace to you that sound is made up of vibrations, and that irregular vibrations simply create noise whereas regular vibrations generate musical notes. But, however familiar the principle may be to you, how would you demonstrate it to a child?

Aha, we thought so!

Well, on these pages are the answers. They are derived from a booklet called "The Construction of Laboratory Apparatus," that is put out by the United Nations Educational, Scientific and Cultural Organization. They are intended for schools and training workshops in underdeveloped countries, but there is no law that says they can't be used for educational fun, too.

Spot holes on the record. For this experiment, you need five concentric rings of holes in your record. The outer ring is to have the most, the next ring fewer,

AS THIS RECORD SPINS, the holes in it make music or noise, depending on which ones are cutting across the stream of air that the boy is blowing. A sewing-machine motor runs this rig.



Copyrighted material

USE CENTERDRILL,
THEN DRILL THROUGH
WITH 1/8" DRILL

HOLE-DRILLING
TEMPLATE

UNEQUAL HOLE SPACING

24 HOLES

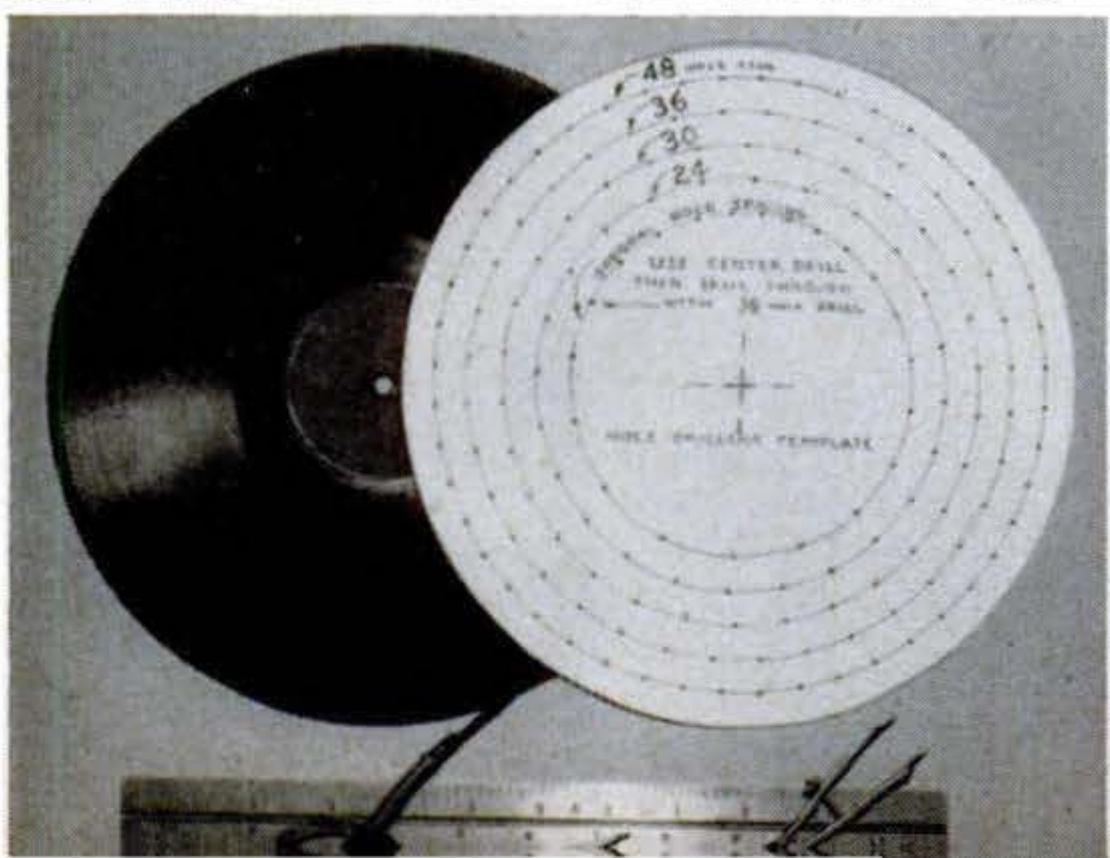
30 HOLES

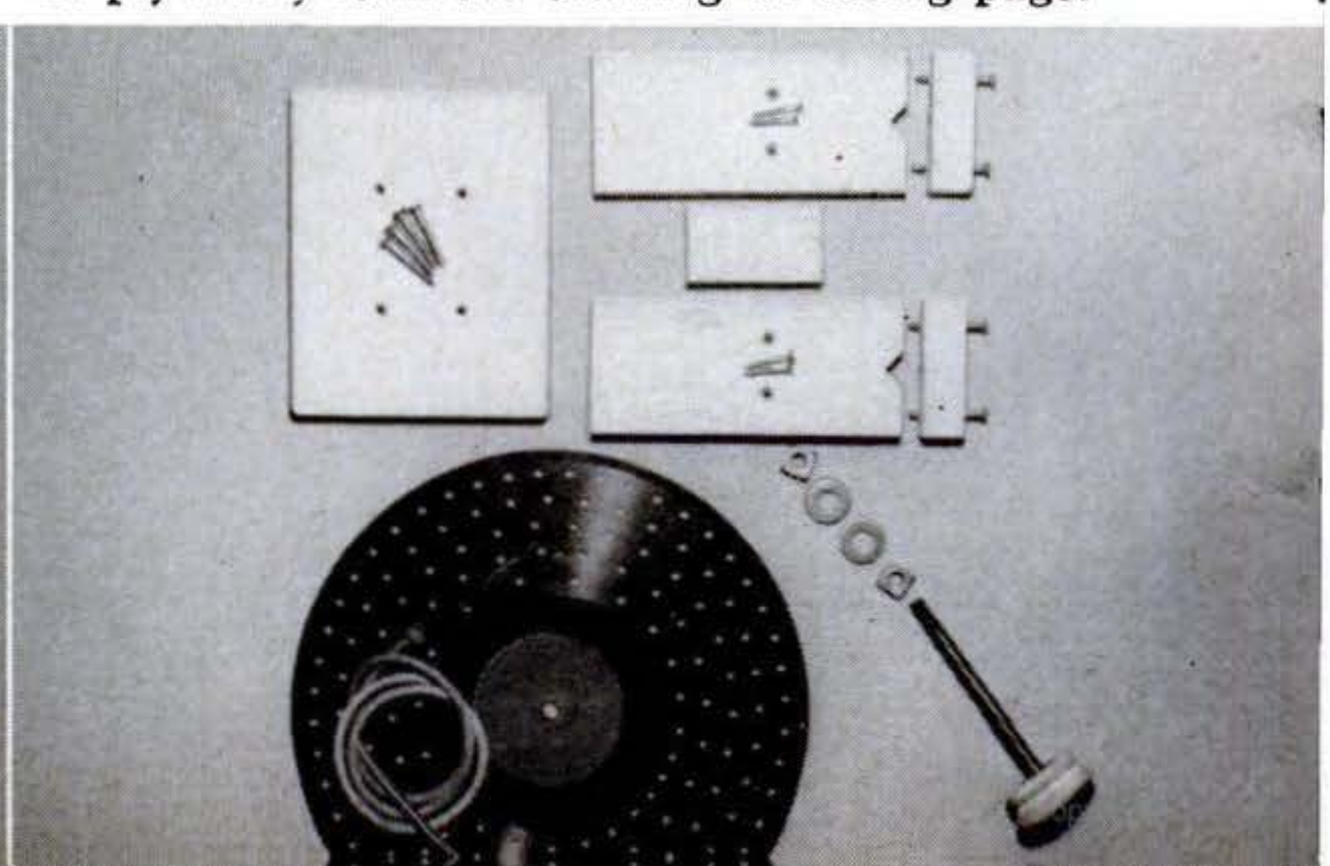
36 HOLES

48 HOLES

DRILLING TEMPLATE made from the pattern above is shown below, before it was rubber-cemented to the unbreakable record as a secure guide for drilling. The numbers on the template tell how many holes are in each concentric ring.

ALL MATERIALS NEEDED to mount the perforated record for a demonstration of how various sounds are created are laid out below. You make a two-bearing block from ¾" lumber or plywood, as in the drawing on facing page.





and so on to the innermost. The holes, however the distance between them changes, must be evenly spaced on all except the innermost ring. Here they must be spaced unevenly.

You need a template, which you can make by drawing circles on a smooth piece of wrapping paper and stepping off the holes with dividers. Or you can cut out the drawing on the facing page and use this to make your template.

Push a pin through the center of the drawing into the wrapping paper. With a divider point, prick through every hole on the drawing. Then shift the drawing until a pin stuck through an end hole will go through the last prick mark in that row on the template. Continue until all holes are spotted on the template.

Punch or cut out the center hole of the template truly. Then thread the template on a pencil and push the pencil point into the center hole of the record. Carefully done, this should center the template perfectly. Apply rubber cement to make it stick. Then with a sharp prick punch, awl or divider point, spot the holes on the record. Leave the template in place while you drill.

Start with a small drill. If you have a centerdrill such as is used for lathe work, start the holes with it. If not, use a No. 50, a $\frac{1}{16}''$ or similar small drill, chucked short so that it runs true.

After starting all the holes, change to a $\frac{1}{8}''$ drill and go through. Do not press too hard, especially when the point is about to break through the record. Should you crack the record, use another; a flawed disc could be dangerous.

Chopping air into sound. To run the siren disc on a drill press, mount it on a $\frac{5}{16}''$ bolt, using washers on both sides and a nut to clamp it tightly. Chuck the bolt shank, and you are in business. Now to show your youngster how different sounds are made.

Remove the bulb from an eye dropper and slip one end of a slim rubber tube over the glass in its place. Put the other end of the tube in your mouth.

Start the drill press at medium speed. Then hold the small end of the eye dropper over one row of holes on the spinning record and blow through the tube. You and the youngster will hear a clear tone.

Move the glass tip to any other row of holes except the inmost one, and you will hear another tone, at a different pitch.

Now hold the glass tip over the inmost row. Instead of a musical note, you'll hear a definitely nonmusical noise.

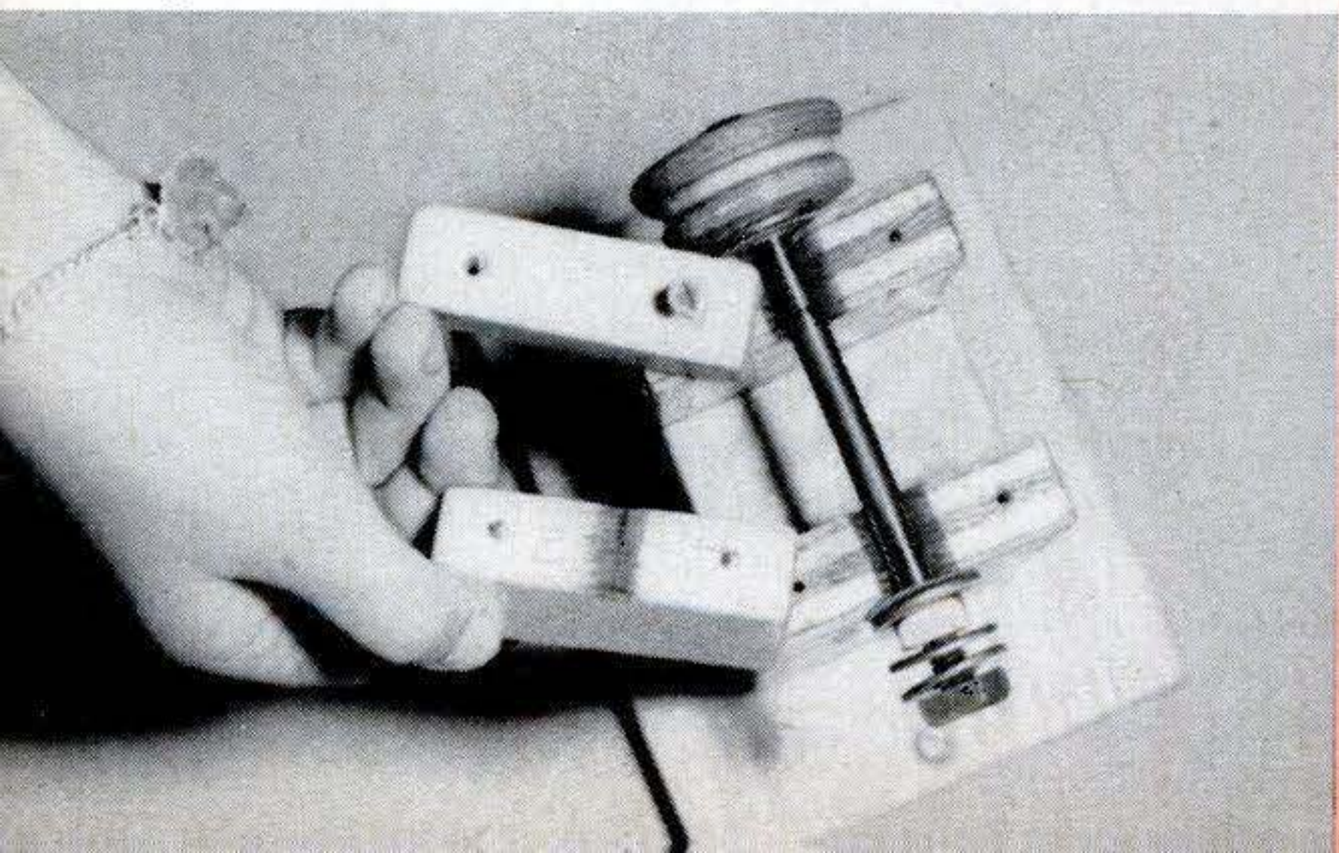
What makes music? The air stream passes through each hole in turn but is chopped off sharply between them. Evenly spaced holes interrupt it in perfect rhythm and result in a single note. The more often the stream is interrupted, the higher the pitch, or frequency. Therefore, at a constant speed, a circle with a lot of holes will produce a higher note than one with relatively few.

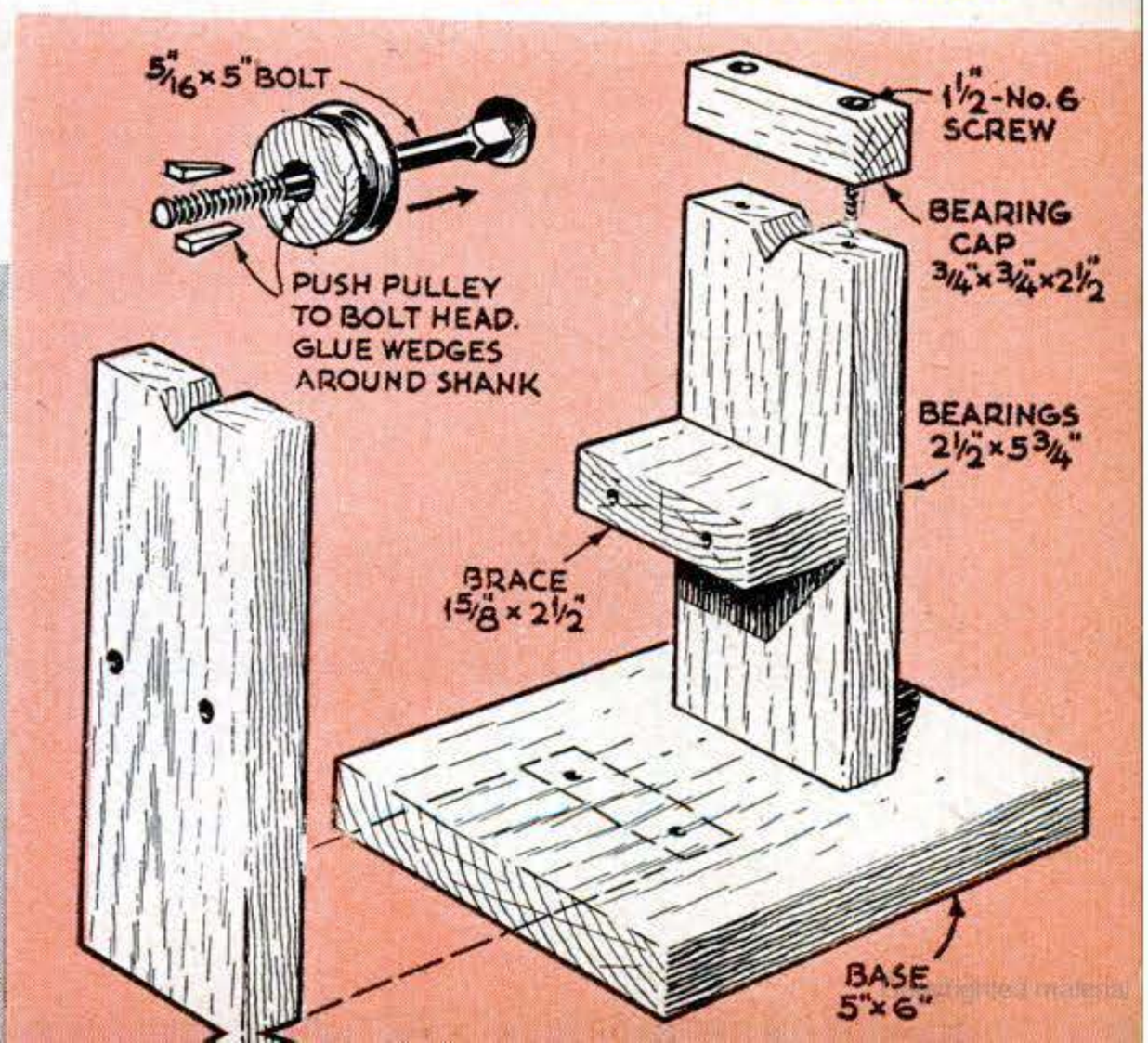
If you vary the speed, you vary the pitch. By turning the drill press on and off, you can make the pitch of any row of evenly spaced holes rise and fall with the characteristic wail of a police siren.

On the other hand, when you blow air through the eye dropper at the row of

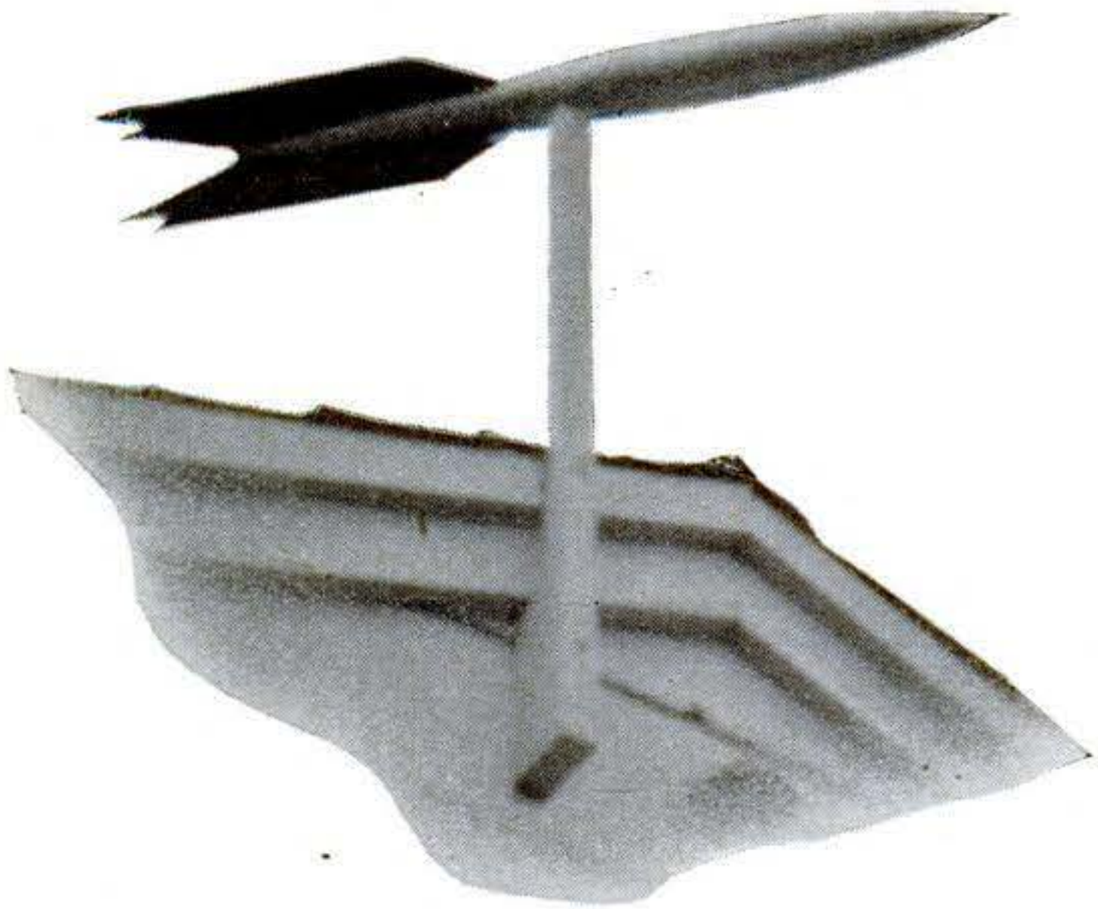
[Continued on page 236]

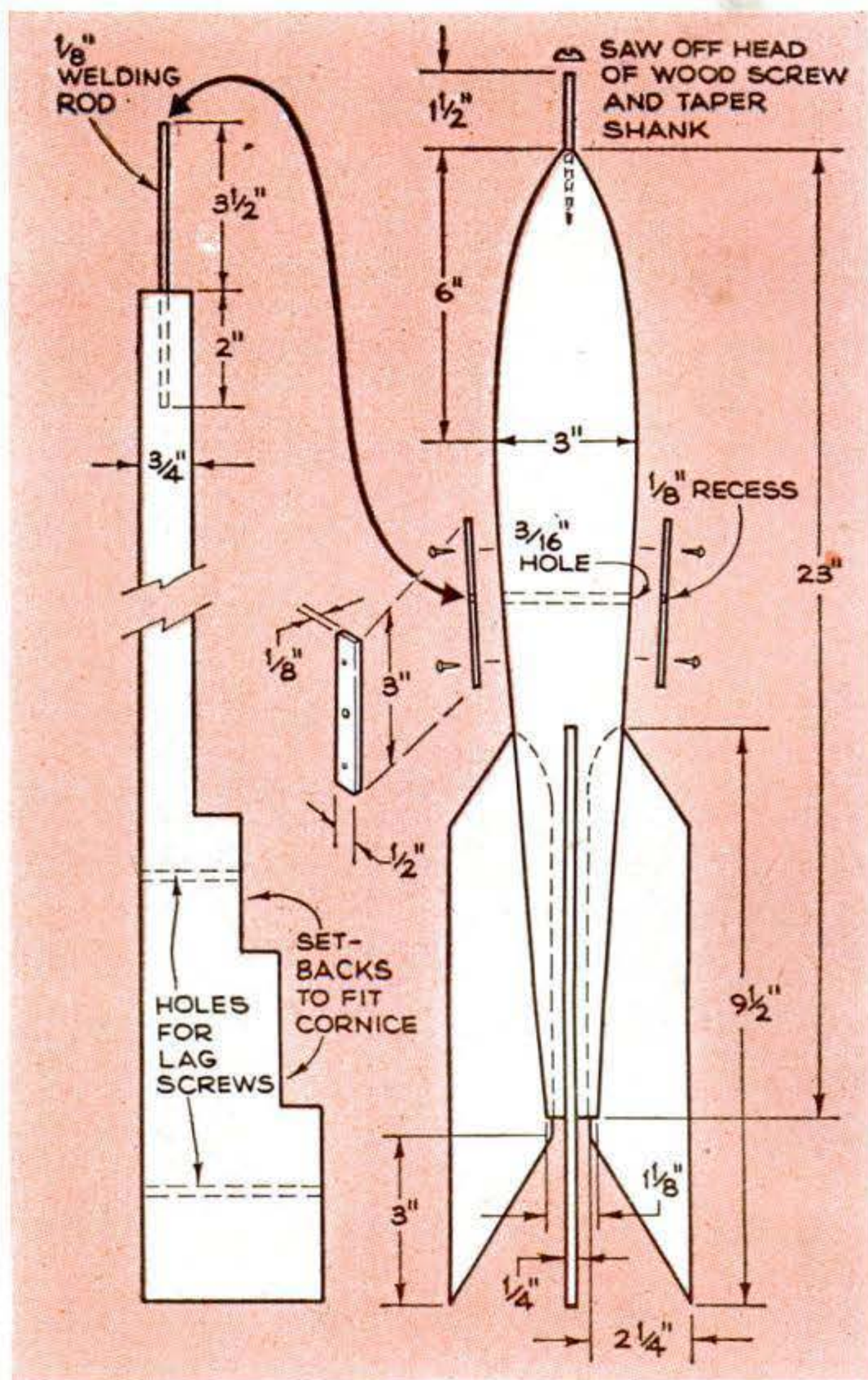
WITH THE SHAFT IN PLACE, tighten the bearing caps just enough to permit free running. If the axle has much shake, file down the bearing-block caps slightly. Lubricate the V notches and caps with a deposit of soft pencil lead.

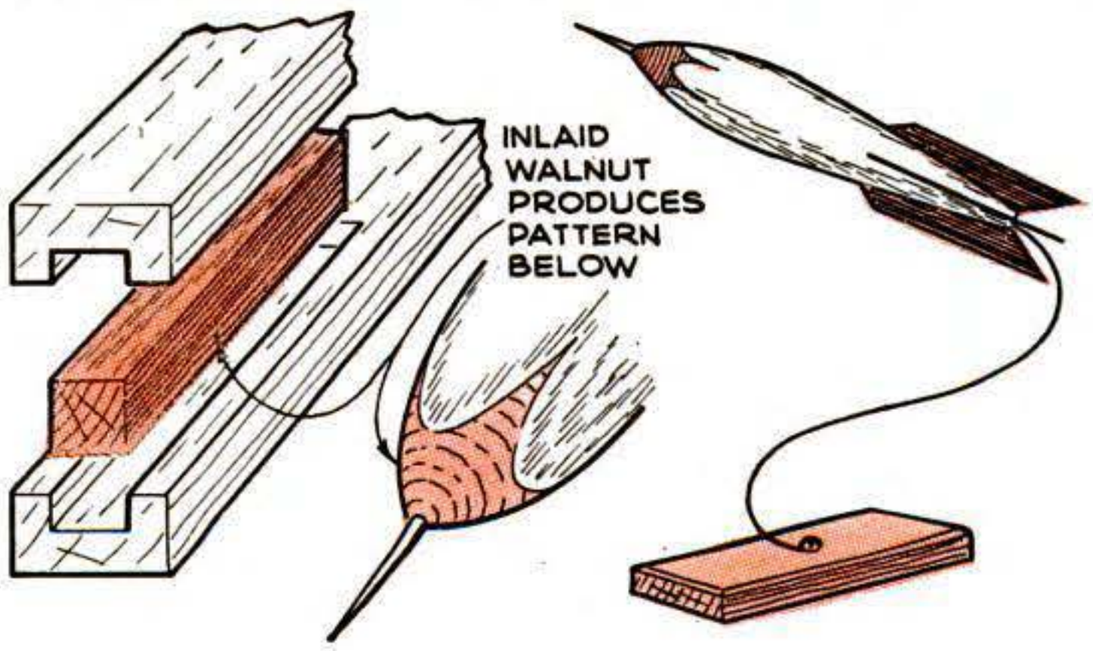




How to turn A Rocket Weather Vane







YOU could call this turning project a two-stage rocket. In one stage it's a striking desk ornament. Or make it twice as big for an unusual weather vane.

For the weather vane, turn the body from a 23″ block of pine measuring at least 3″ by 3″ in cross section. Scribe centers on the ends. Drive a long wood screw into one end until only the unthreaded shank projects. Remove the screwhead and file to a point.

Turning the body. At the other end of the block, cut ¼″ grooves for the fins. Force bits of scrap into the grooves to prevent chipping. Use a chuck to grip the screw shank in the lathe while you turn and sand the rocket to contour. Then pry out the groove-filling stock. Cut the fins and glue them in position.

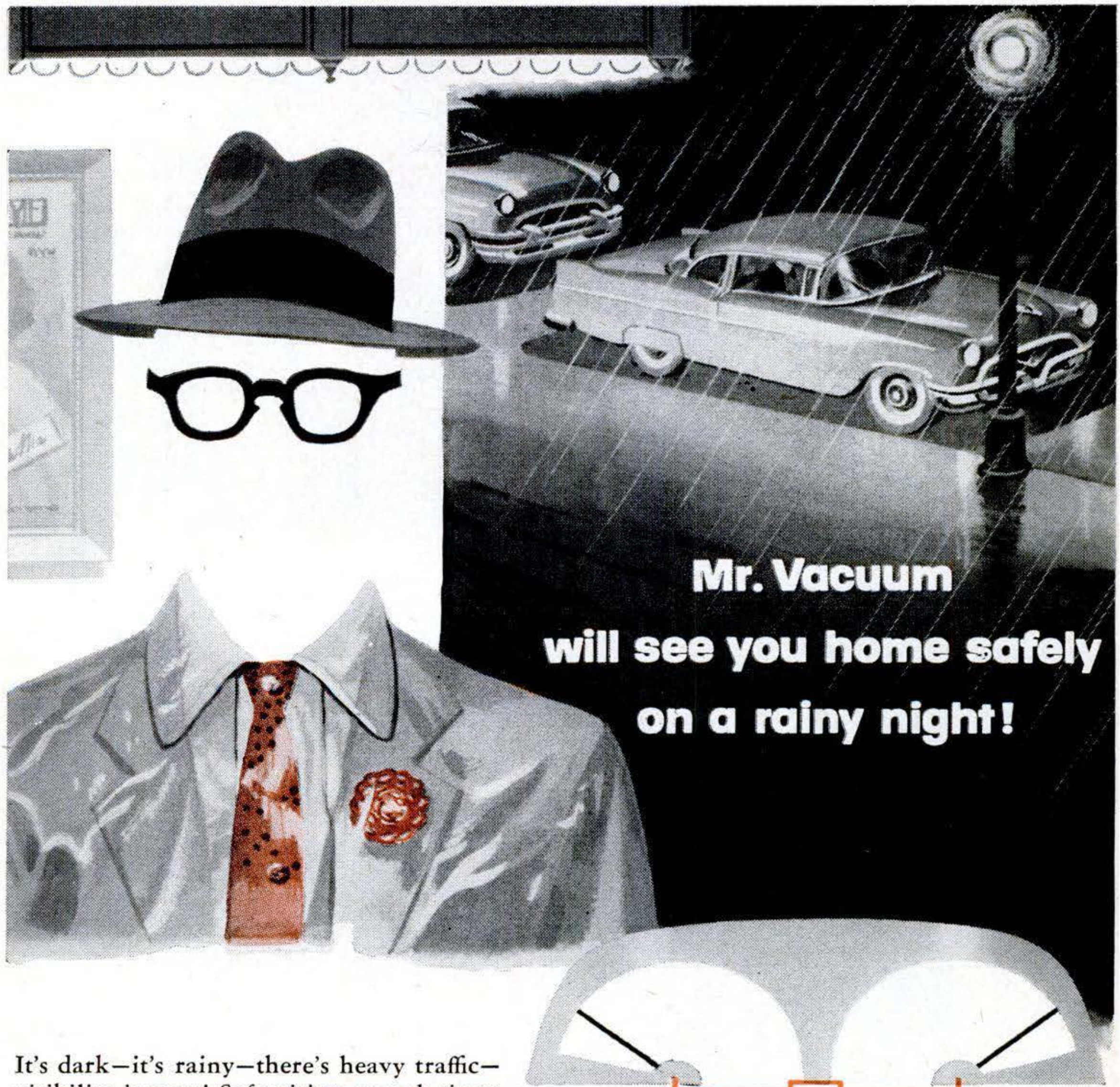
Balance the rocket on a pencil and bore a ⅛″ hole through it $\frac{1}{16}$″ ahead of the balance point. For bearing plates use ⅛″ flat steel stock. Bore a ⅛″ hole through the lower bearing plate and halfway through the upper bearing plate. Drill holes in both plates for wood screws.

Finishing touches. Align the bearing holes and mark the screw locations on the rocket. Then ream out the bearing hole in the rocket to $\frac{3}{16}$″ diameter, pack it with grease and screw on the plates. Give the rocket a coat of aluminum paint and accent the four fins with red paint.

Cut the weather-vane mast to match the contour of the fascia strip on your house or garage. Drill a ⅛″ hole for a welding-rod spindle, mount the rocket and stand by for a breeze.

If you prefer the desk ornament, turn it from maple. A walnut block, inserted in the nose before turning, produces a vari-toned effect. The fins and base are also cut from walnut, and the connecting loop is a length of brass spring wire.—*H. R. Corry, Miles City, Mont.*

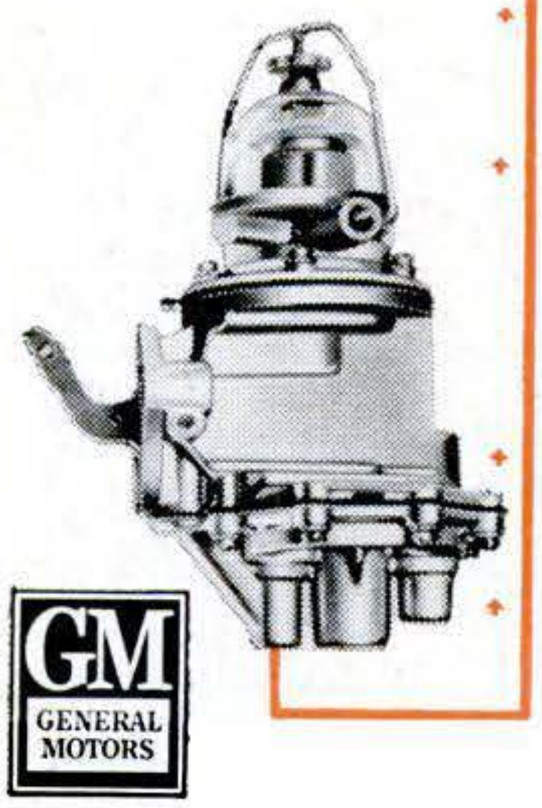
Copyrighted material



It's dark—it's rainy—there's heavy traffic—visibility is poor! Safe vision at such times depends upon strong, steady windshield wiper action to keep the obscuring rain cleared from the glass. That's when you need the help of Mr. Vacuum!

That's what an AC Combination Fuel and Vacuum Booster Pump provides. Perhaps your car has one—many cars do. If not—your AC dealer can easily replace your present fuel pump with this double-value, double-purpose AC product.

Safety is everybody's business. You'll drive under trying conditions more safely, more **comfortably, and with less fatigue if you ride with Mr. Vacuum. It's the extra vacuum power that insures safer vision.**



AC FUEL PUMPS WITH VACUUM BOOSTER

DEPENDABLE FUEL SUPPLY *PLUS*
DEPENDABLE WIPER ACTION—
EVEN WHEN YOU SPEED UP

GM GENERAL MOTORS

AC SPARK PLUG DIVISION • GENERAL MOTORS CORPORATION
FLINT, MICHIGAN

AC FUEL PUMPS ARE STANDARD FACTORY EQUIPMENT ON 9 OUT OF 10 CARS AND TRUCKS ON THE ROAD TODAY!

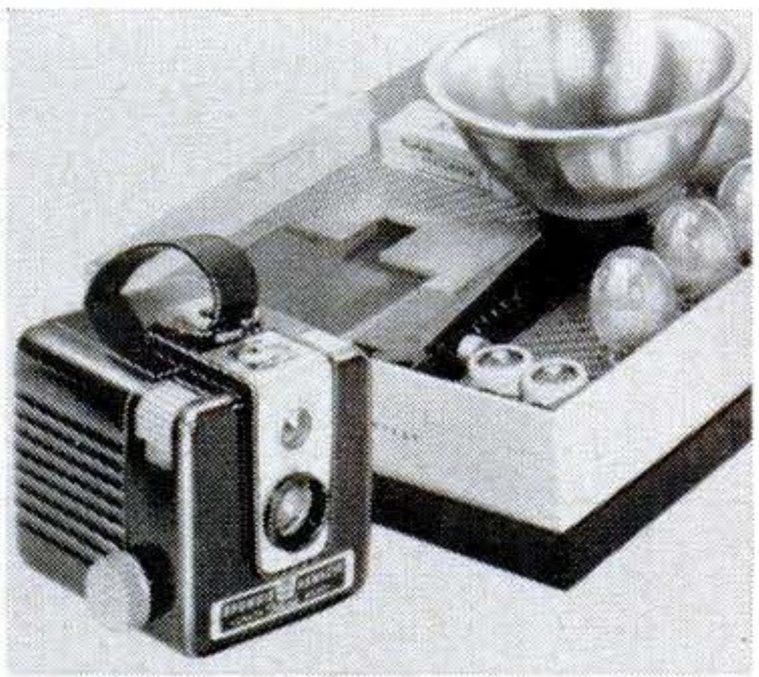
Copyrighted material

There's a just-right

Start your shopping on these pages...

Ideal "first" outfit. Brownie Holiday Camera, flasholder, flashguard, batteries, bulbs, and film. Brownie Holiday Flash Outfit complete, **$9.75.** Camera alone, **$4.95**

Complete ready-to-use photo-flash gift outfits . . .



Brownie Hawkeye has no "settings" to adjust. Makes 12 snapshots per roll of color or black-and-white film indoors or out. Brownie Hawkeye Flash Outfit complete, **$14.35.** The camera alone, only **$7.45**

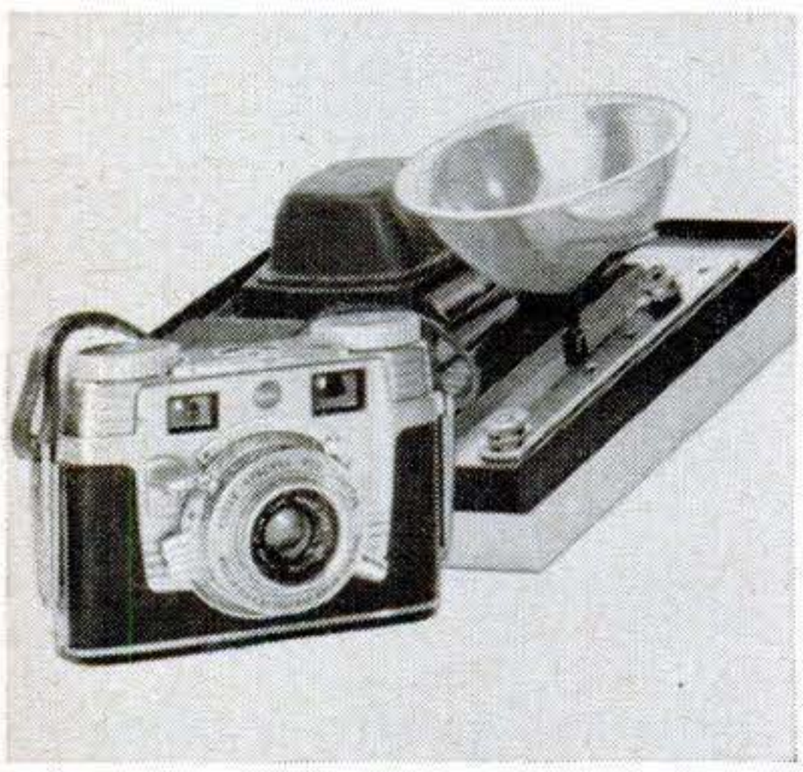
Brownie Bull's-Eye lens focuses to 4 feet for close-ups, adjusts by dial for snapping "groups" or "scenes." Other deluxe features. Brownie Bull's-Eye Flash Outfit complete, **$18.60.** The camera alone, only **$13.50**

Kodak Duaflex—"Preview-Finder" lets you see pictures before you shoot. Kodak Duaflex Flash Outfit complete, only **$21.75.** Duaflex Kodet Camera alone, **$14.95** (brown-finish camera slightly higher). A Deluxe Duaflex *f*/8 Camera and Flash Outfit are also available.

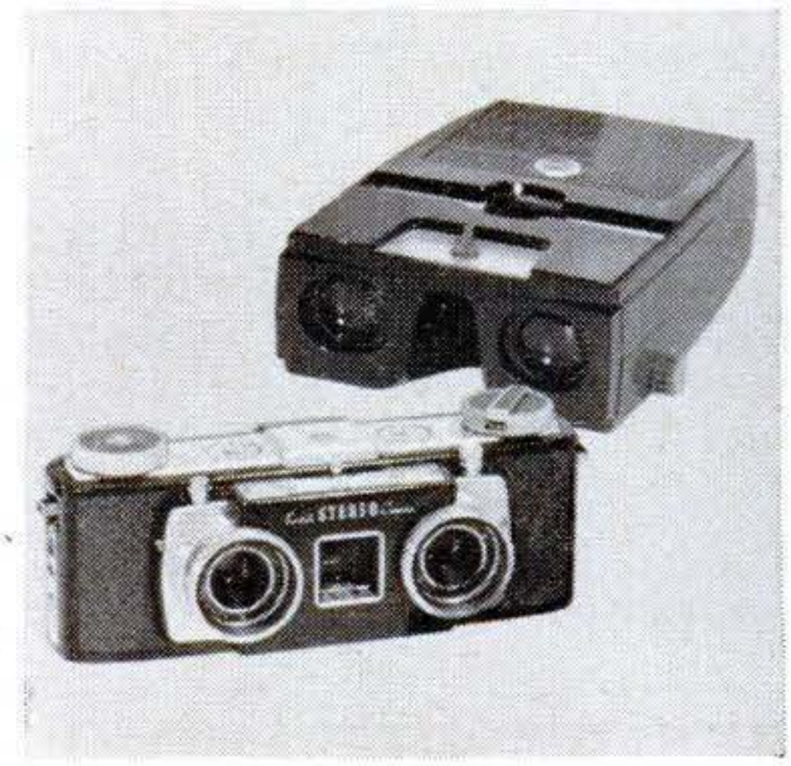
Deluxe Kodak Gift Kits for Color-Slide Fans . . .

An all-time color-slide favorite, the versatile Kodak Pony 135, Model C, features a fast *f*/3.5 lens, 1/300 shutter. Kodak Pony 135 Outfit (camera, flasholder, case) **$49.65.** The camera alone, **$33.75**

Kodak Bantam RF takes Kodacolor snaps as well as full-color slides. Fine rangefinder, *f*/3.9 lens, 1/300 shutter. Kodak Town-and-Country Outfit (camera, flasholder, case) **$65.45.** Kodak Bantam RF Camera alone, only **$49.75**



Kodak's Signet 35 features a matchless Ektar *f*/3.5 Lens, coupled rangefinder, 1/300 shutter, precision controls. Kodak Signet 35 Outfit (camera, flasholder, case) **$91.45.** The camera alone, only **$75**



Kodak Stereo Camera for 3-D color-slides. Twin *f*/3.5 lenses, 1/200 shutter. Kodak Stereo Outfit (camera, Stereo Viewer I) **$97.25.** Camera alone, **$84.50.** Stereo Viewer I, **$12.75;** Viewer II, **$23.75**

Copyrighted material

Kodak gift for everyone

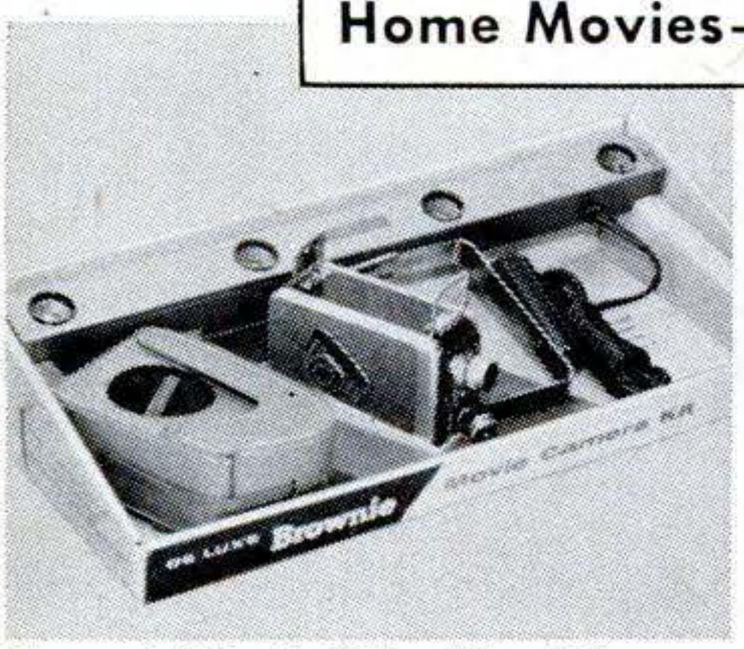
finish happily at your Kodak dealer's

(Ask him about small down payments, easy terms)

New Do-It-Yourself Photo-Hobby Outfits

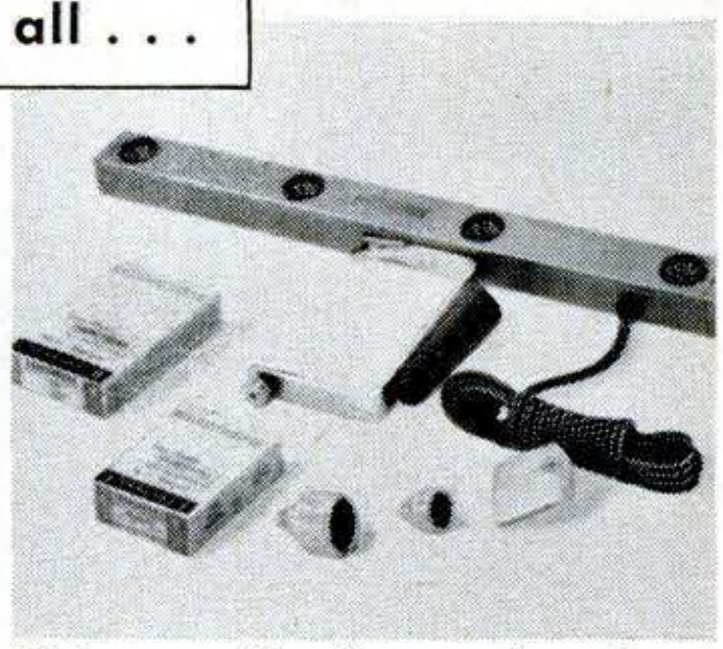
It's easy to develop negatives and print snapshots at home with a Kodak Photo-Hobby Outfit. There are two *complete* "do-it-yourself" Outfits to choose from—alike except for the snapshot printer they feature and the amount of chemicals and printing paper they contain. Each comes with an 11 x 14-inch card (above) which explains the simple steps for developing and printing. Kodak Deluxe Photo-Hobby Outfit, **$16.95.** Regular Photo-Hobby Outfit, **$9.95.** The Kodak Deluxe Photo-Hobby Printer alone, only **$7.95**

Home Movies—the finest family gift of them all . . .



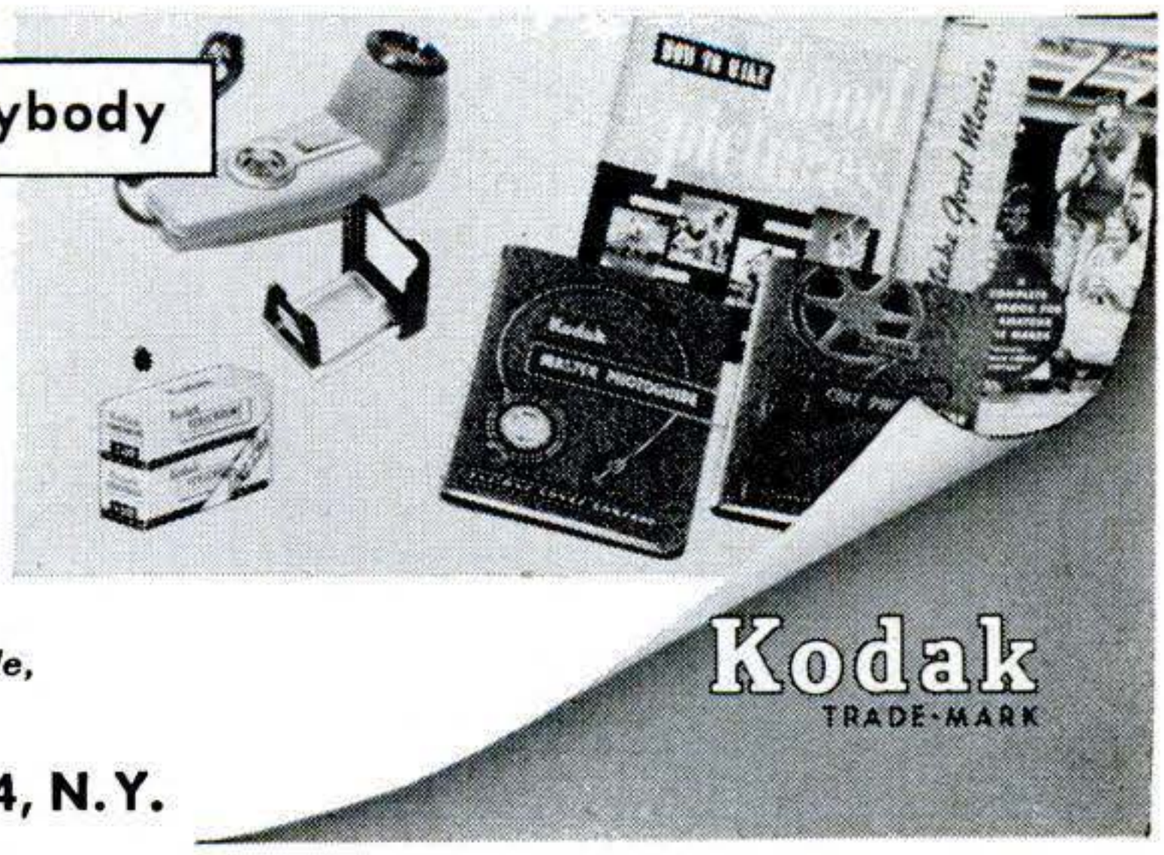
Brownie Movie Kit with a 4-Lamp Movie Light (lamps extra) to provide plenty of light for indoor color movies. Brownie Movie Kit with *f*/2.7 lens, **$49.95.** Brownie Movie Kit with fast *f*/1.9 lens, **$59.20**

Complete movie-making outfit. To *make* color movies, a Brownie Movie Camera, *f*/2.7 lens. To *show* them, a Brownie Movie Projector with an *f*/1.6 lens, *plus* a preview screen. Brownie Movie Outfit complete, **$99.50**



Welcome gifts for movie-makers. Brownie 4-Lamp Movie Light, **$8.45.** Kodak Converters for 8mm Brownie Movie Cameras, Wide angle, Telephoto, **$18.50** ea. Kodachrome Movie Film, from **$3.75**

Kodak Photo "Stocking Gifts" for Everybody



Film—buy it in thrifty Kodak Duo-Paks, one roll for the camera, another for a spare. Popular sizes of black-and-white, from **75¢.** Kodacolor, from **$1.70.** For color-slide fans—Kodaslide Dial-Lite Viewer, **$12.95;** Kodaslide Pocket Viewer, **$1.95.** Books for fact hunters —"How To Make Good Pictures," **$1;** "How To Make Good Movies," **$2;** Kodak Photoguides, **$1.75** ea. Many other gifts to choose from.

Prices are list, include Federal tax where applicable, and are subject to change without notice

Kodak
TRADE-MARK

Eastman Kodak Company, Rochester 4, N.Y.

Copyrighted material

How to Build a Wobble Sander

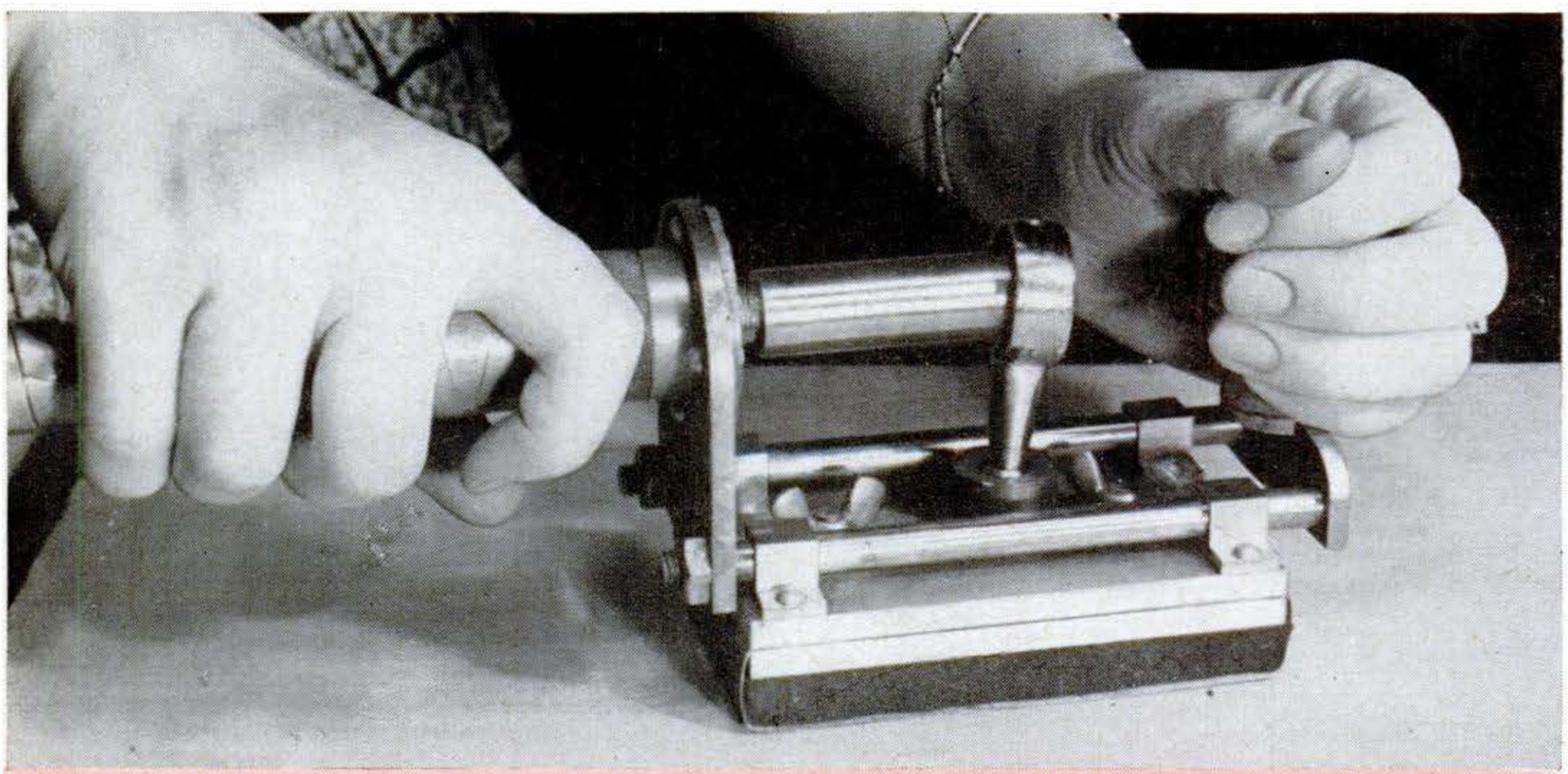
You just guide it on the work. Its own weight, and power supplied by a flexible shaft, will smooth yards of wood with little effort.

By Richard C. Decker

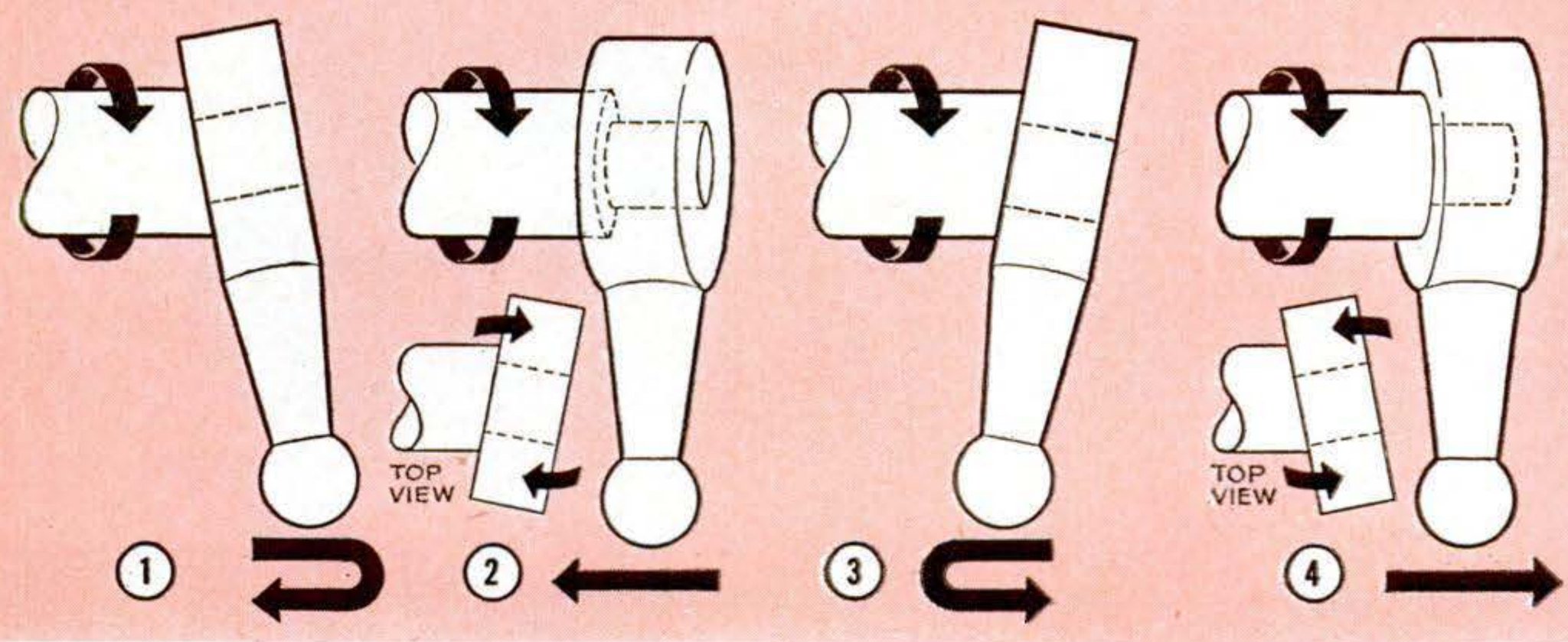
A POWER sander like this, driven by a flexible shaft on a ⅓-hp. motor, makes quick work of sanding table tops, floors and other broad surfaces. The action of the wobble arm moves the sanding plate back and forth 3,450 times per minute.

Cut two 3″-by-4½″ plates from ¼″ aluminum. Clamp them together and drill No. 7 holes through both. Tap the holes in the sole plate ½″-20 and enlarge the holes in the upper slide plate to ¼″. Turn

[*Continued on page 222*]

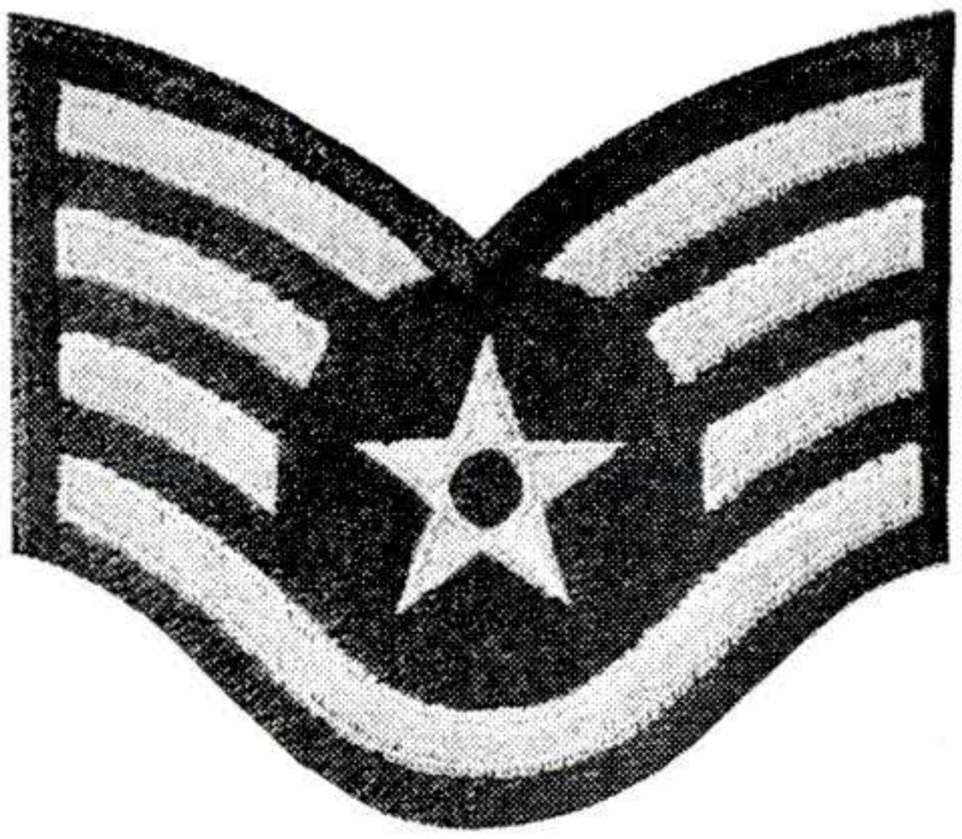


WOBBLING LIKE A WHEEL ON A BENT AXLE, the eccentric arm drives the sanding plate forward and back in a straight line. In the drawing below, when the offset stub is "bent" upward (1), the arm has completed a stroke and moves as follows: as the stub rotates a quarter turn (2), the arm swings back one-half stroke and twists slightly; in the bent-down position (3), it has completed one full stroke back and is about to start forward; in another quarter turn (4), it moves forward one-half stroke and twists in the opposite direction, untwisting again as the stub bends up to complete the cycle.



Copyrighted material

MECHANICAL SKILLS CAN GET YOU AHEAD IN THE U. S. AIR FORCE



Here's why —

If you're interested in mechanics, join the U. S. Air Force. As an Airman you may develop your technical ability and learn a skill that will pay well...and win you extra stripes. Such interesting career fields as Aircraft and Engine Maintenance, Rocket Propulsion and Intricate Equipment Maintenance are open to you, if you qualify. Don't delay—see your local Air Force Recruiter or mail the coupon, *today*.

YOU GO PLACES *FASTER* IN THE U. S. AIR FORCE

M-19-PS-2

AIRMAN INFORMATION BRANCH
Box 2202, Wright-Patterson AFB
Ohio

Please send me more information on my opportunities as an Airman in the U. S. Air Force.

Name_____

Address_____

City_____ Zone____ State_____

Copyrighted material

[Continued from page 220]

the wobble-arm well from 1½″-diameter drill rod and rivet it in position on the slide plate. Make two slide rods from ⅜″ drill rod. Thread one end of each $\frac{5}{16}$″-18 and turn a short $\frac{5}{16}$″ shoulder on the other end. Make four slide bearings from chunks of ⅝″ brass, and rivet them to the slide plate, using the slide rods to align them. Cut the front and back end plates from 3/16″ flat steel. Fasten the front plate to the slide rods by peening-over the shouldered ends of the rods. Secure the backplate to the rods with two $\frac{5}{16}$″ nuts and lock washers.

Making the wobble arm. Rough-shape the wobble arm from a flat piece of ½″ cold-rolled steel. File the outer diameter of the bearing housing smooth and round, chuck it in a lathe and bore a force-fit hole for the bearing.

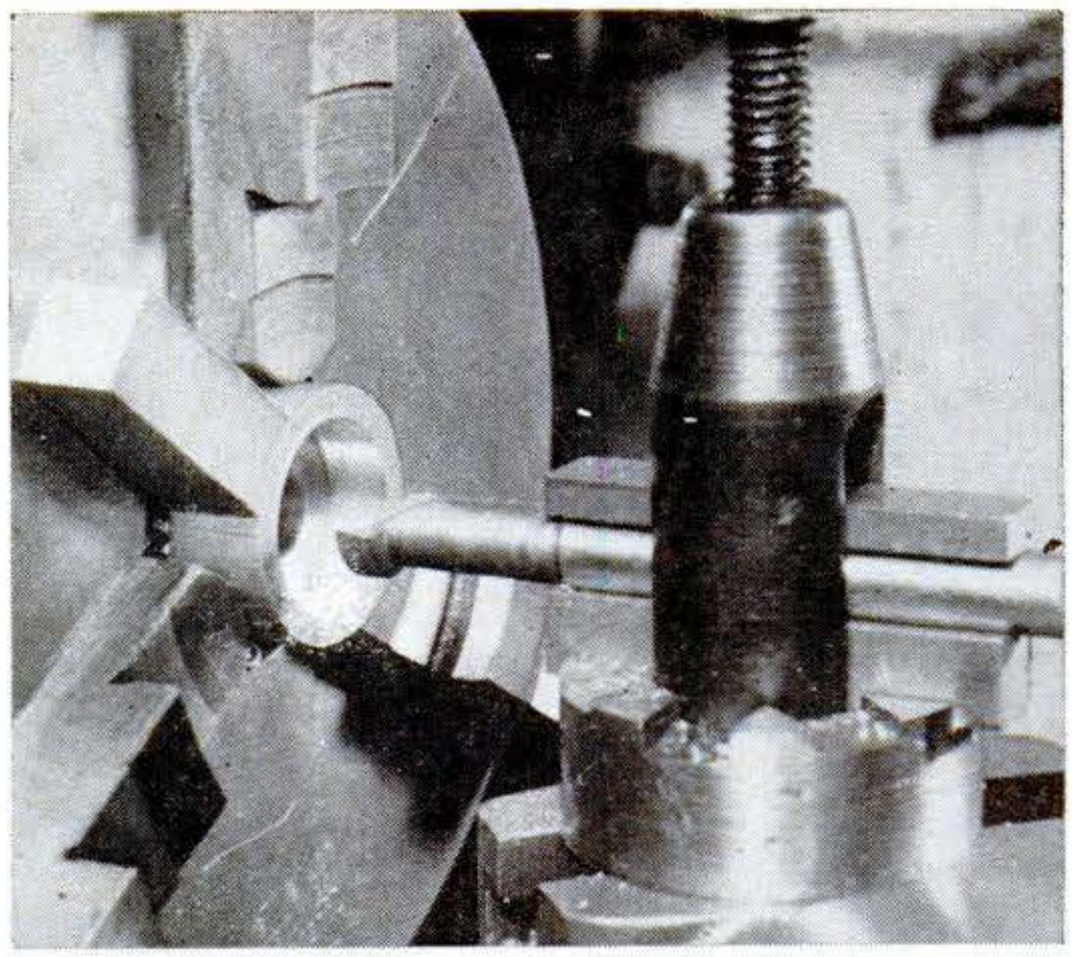
Centerdrill both ends of the wobble arm, mount it between centers and drive it with a C clamp dogged to the faceplate. Turn the taper on the arm, and shoulder the bottom end to fit a ¼″ hole drilled through a steel ball. Mount the ball on the shoulder and peen the end.

How to make it wobble. Lay out and punch centers on the wobble shaft as shown in the drawing on page 224, and turn the offset stub end to a force fit in the wobble-arm bearing. The centers must be laid out accurately, or up-and-down motion of the arm will result.

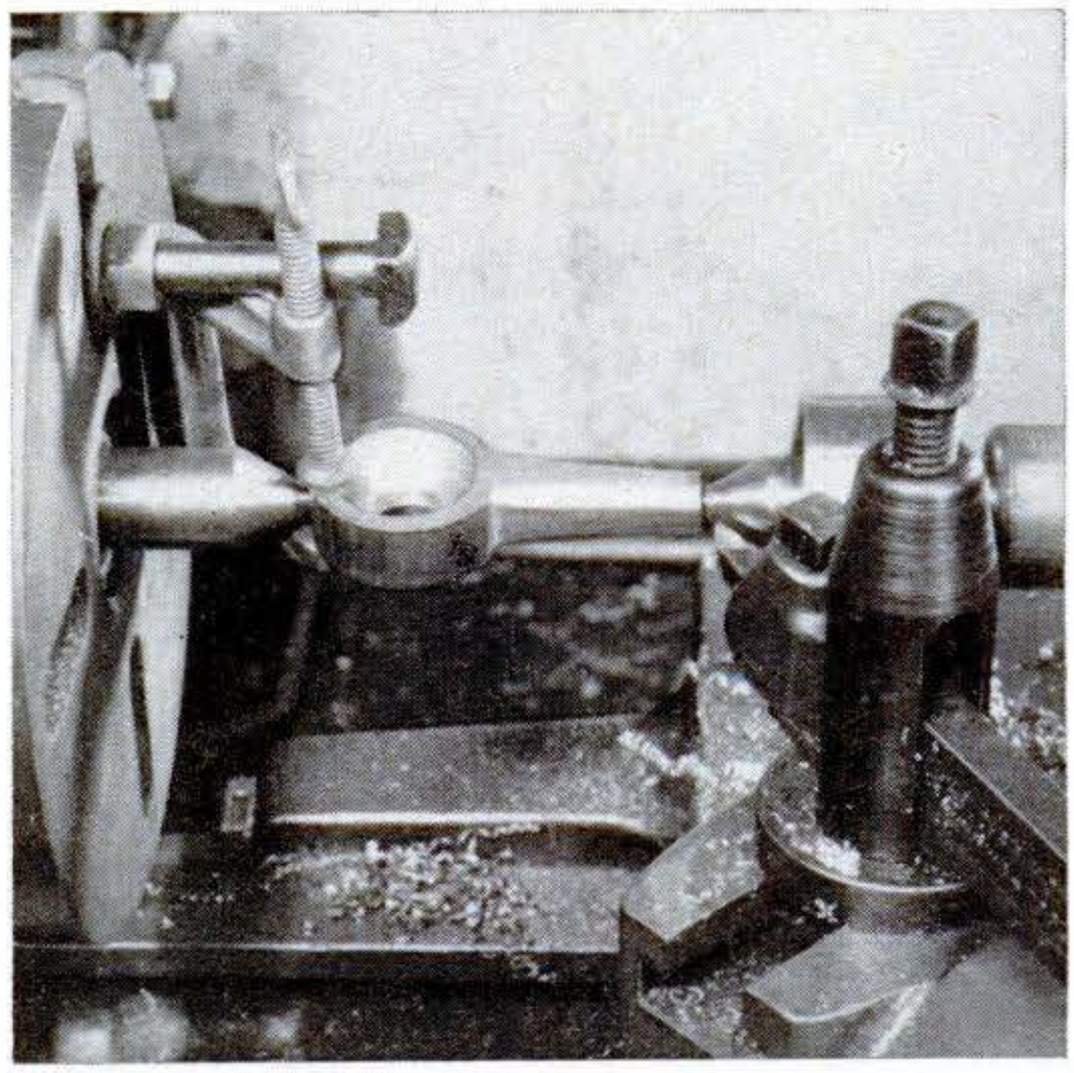
Mount the shaft next in the chuck, and drill and thread to match the threads on the end of your flexible shaft.

Up until now, the construction is the same regardless of the type of flexible shaft you own, but you'll have to fit the sleeve on the backplate to your particular shaft. The one shown was threaded and riveted to the backplate so that the threaded collar on a Montgomery Ward shaft could be used to fasten the shaft to the sander. If your shaft has no collar, a setscrew can be installed in the sleeve to hold the flexible-shaft handle in place. In any case, the shaft must be mounted accurately in line with the center of the bearing in the wobble arm.

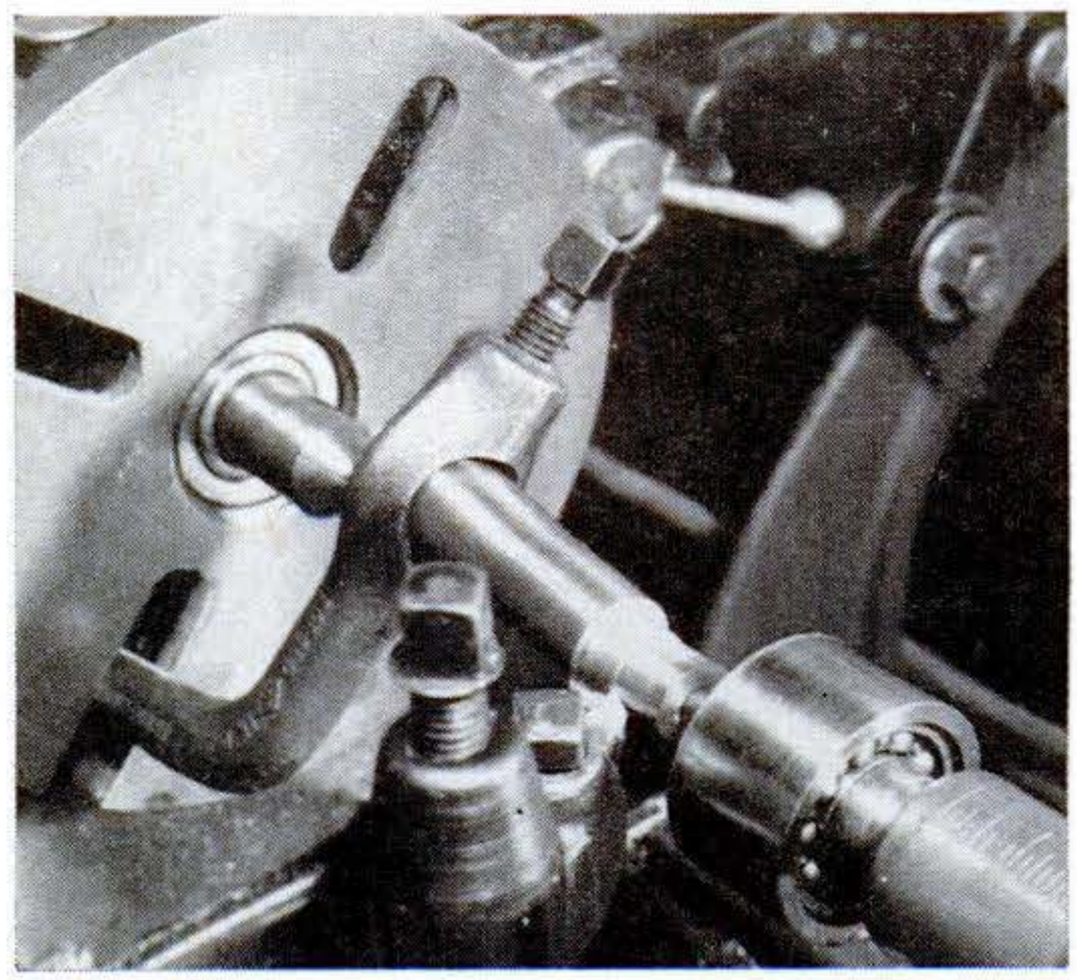
[Continued on page 224]



CHUCK ROUGHED-OUT WOBBLE ARM in lathe and bore a force-fit hole to take ball bearing.



MOUNT ON CENTERS and drive with a C-clamp dog to taper the shank and shoulder the end.



WITH THE WOBBLE-ARM SHAFT mounted off center, machine the eccentric end to fit in bearing.

Copyrighted material

Texaco Tips On Car Care

← Safety check your heater hose connections

If the rubber tubing between your heater and motor block is weak, it may break and splash your engine with the coolant and anti-freeze. Carefully inspect these hose connections. Interior linings on hoses three or four years old may have separated and the entire connection should be replaced. You'll find your heater will work better, too. Your nearby Texaco Dealer has a stock of new tubing on hand.

Safeguard your chassis with proper lubrication

Marfak chassis lubrication protects your car against winter weather. It's tough and stretchy . . . clings tightly to points of wear and friction . . . won't squeeze out, jar out or wash out. So you get smooth, *cushiony* motoring for 1,000 miles or more. And remember — your car is lubricated by chart, not by chance. Today, drive in for longer lasting *Marfak* chassis lubrication. See your Texaco Dealer, *the best friend your car has ever had.*

MARFAK Lubrication

TEXACO

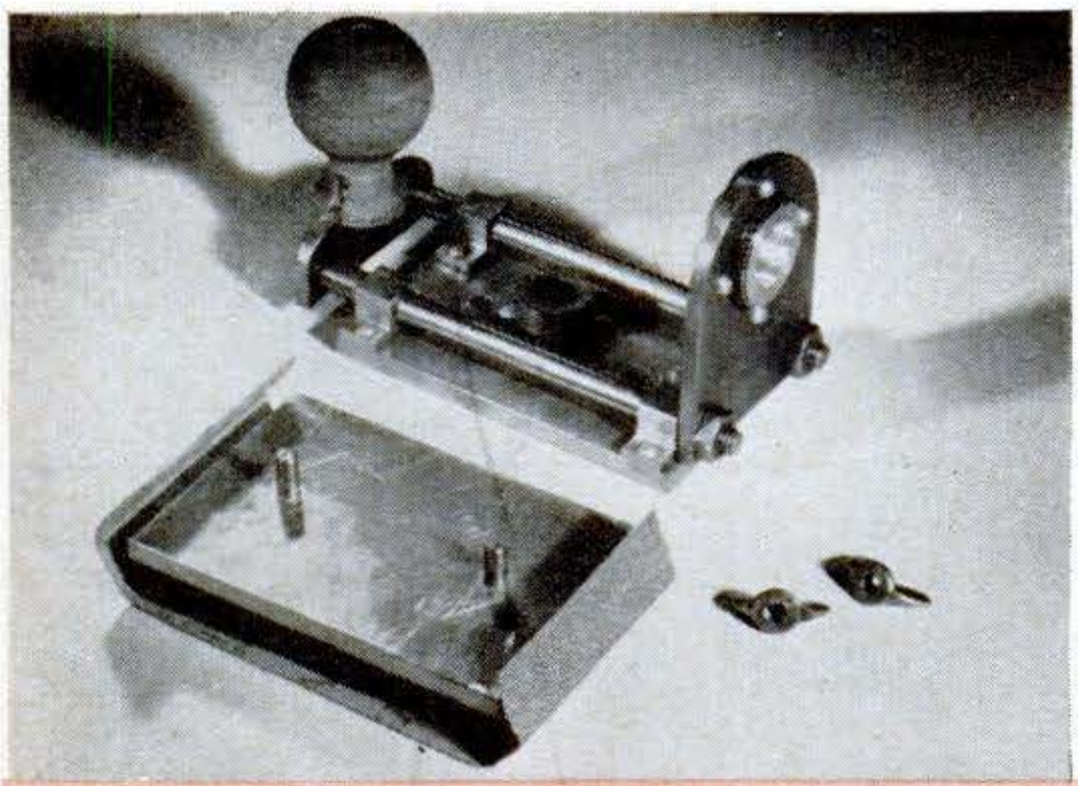
TEXACO DEALERS IN ALL 48 STATES

Texaco Products are also distributed in Canada and in Latin America

THE TEXAS COMPANY

TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE, on TV Saturday nights, NBC.

Copyrighted material

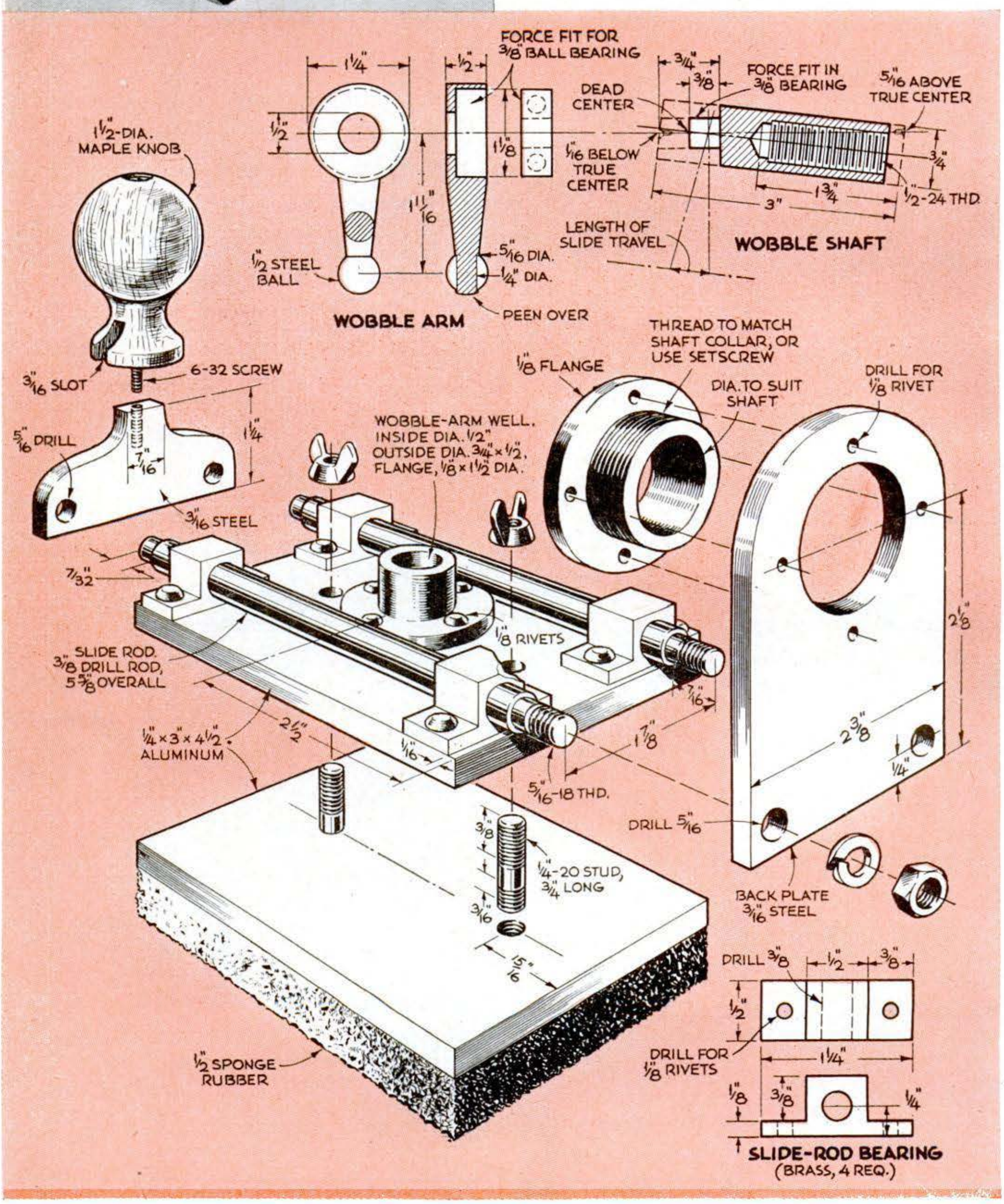


[*Continued from page 222*]

To attach sandpaper, loosen the two wing nuts, fold the paper over the ends of the sole plate, and tighten again to clamp the ends between the plates. Use open-coat aluminum oxide paper.

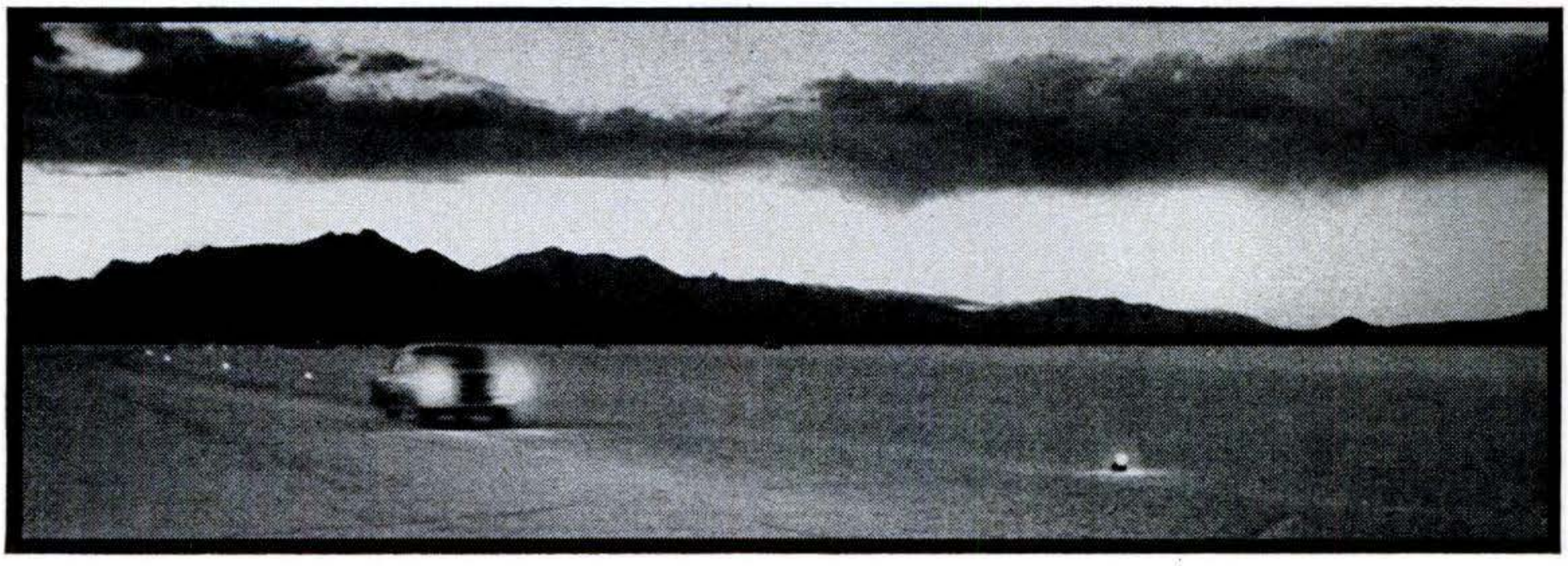
Lubricate the rods and their four bearings with light oil and put cup grease in the wobble-arm well. END

TO USE SANDPAPER, clamp it between the sole and slide plates, lock it in with the wing nuts.



Copyrighted material

Every power and performance record in the book smashed by new '56 Dodge at Bonneville Salt Flats!



AAA CALLS TEST "MOST AMAZING DEMONSTRATION OF PERFORMANCE AND ENDURANCE IN AUTOMOTIVE HISTORY!"

Day and night, for 14 gruelling non-stop days, this new 1956 Dodge Custom Royal 4-Door Sedan shattered all American stock car records in the unlimited closed car division for every distance up to 31,224 miles. A. C. Pillsbury, AAA official in charge, wired, "This amazing performance demonstrates the great power and rugged endurance of your fine new product." No specially equipped or "souped-up" car, this new champion was *selected at random* from the Dodge production line by AAA officials. It's the *same* car you yourself can buy today, powered by our new 230 horsepower V-8 engine.

Here's how the records fell to the dynamic new '56 Dodge!

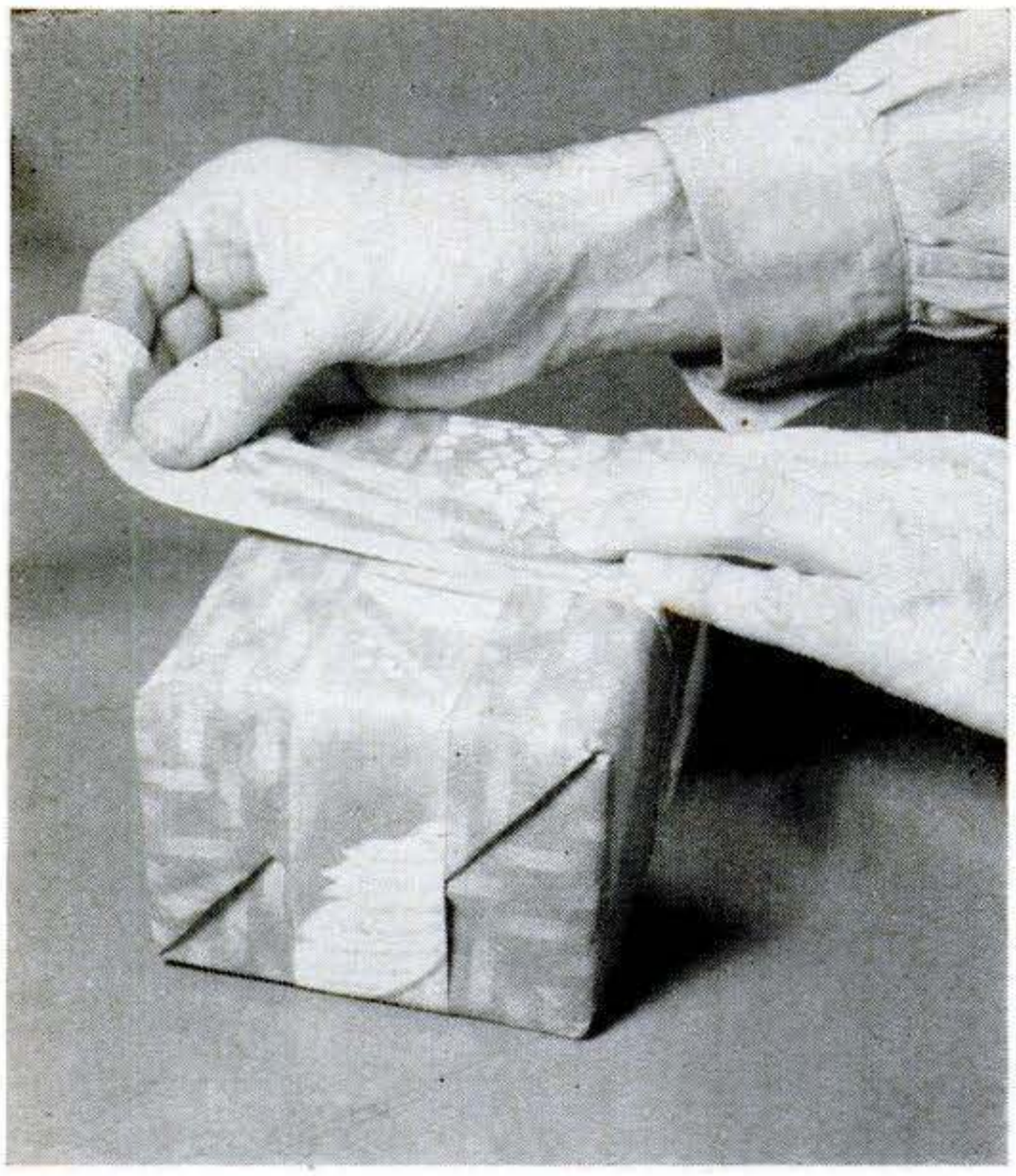
- All-time AAA record of 92.86 mph for 14 days.
- Every AAA American and International performance and endurance record for American closed cars up to 31,224 miles.
- 27 World's Unlimited Records.
- Every International Class B record from 4,000 through 31,224 miles.
- Total of 306 records in all.
- New AAA record 114.05 mph for flying-start mile.
- New AAA record 79.55 mph for standing-start mile.

Plenty of style too! The lady in your life will go for the dramatic new Jet-Fin styling, the "Panel-Perfect" Jacquard fabrics, the Magic Touch push-button driving.

Don't buy any '56 car until you see and drive the **New '56 DODGE**

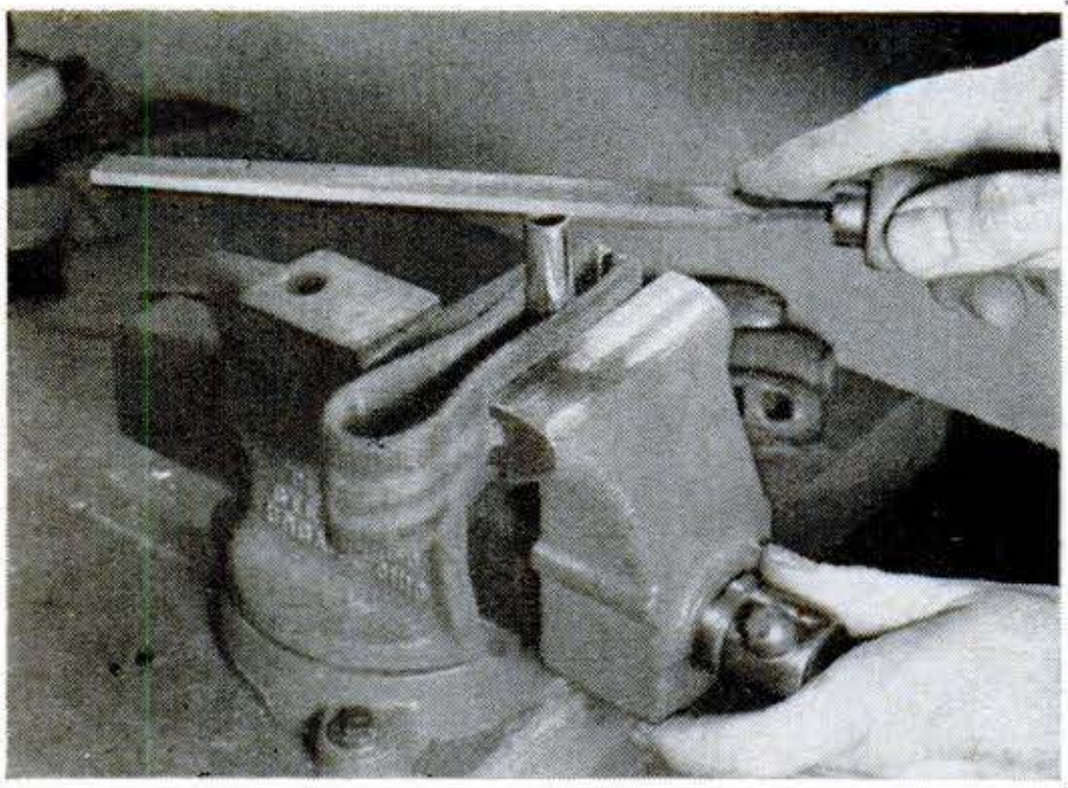
VISIT YOUR DODGE DEALER NOW

Copyrighted material



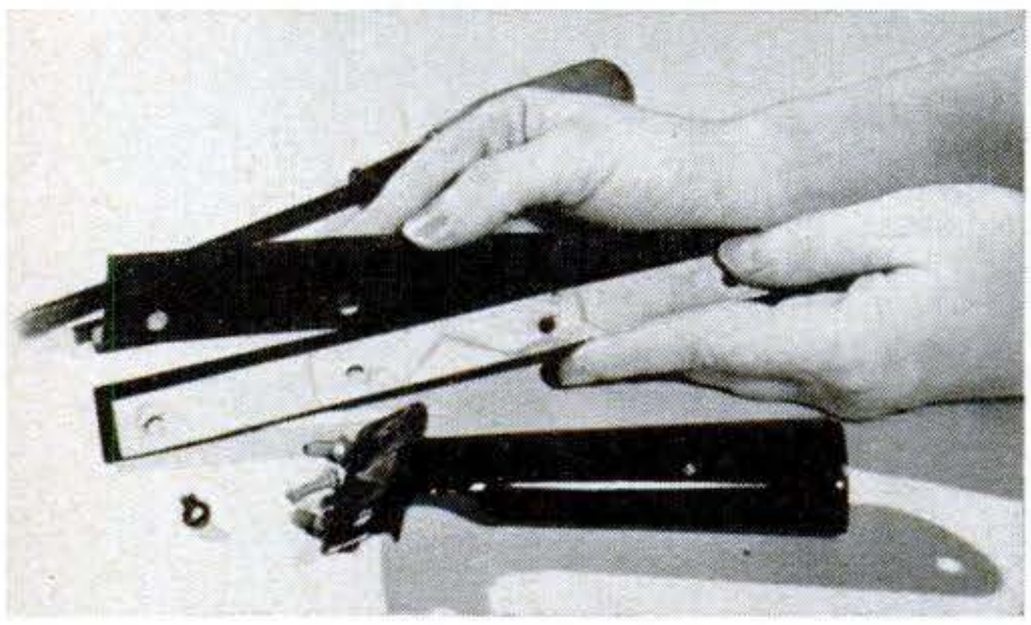
Wallpaper Seals Xmas Gifts

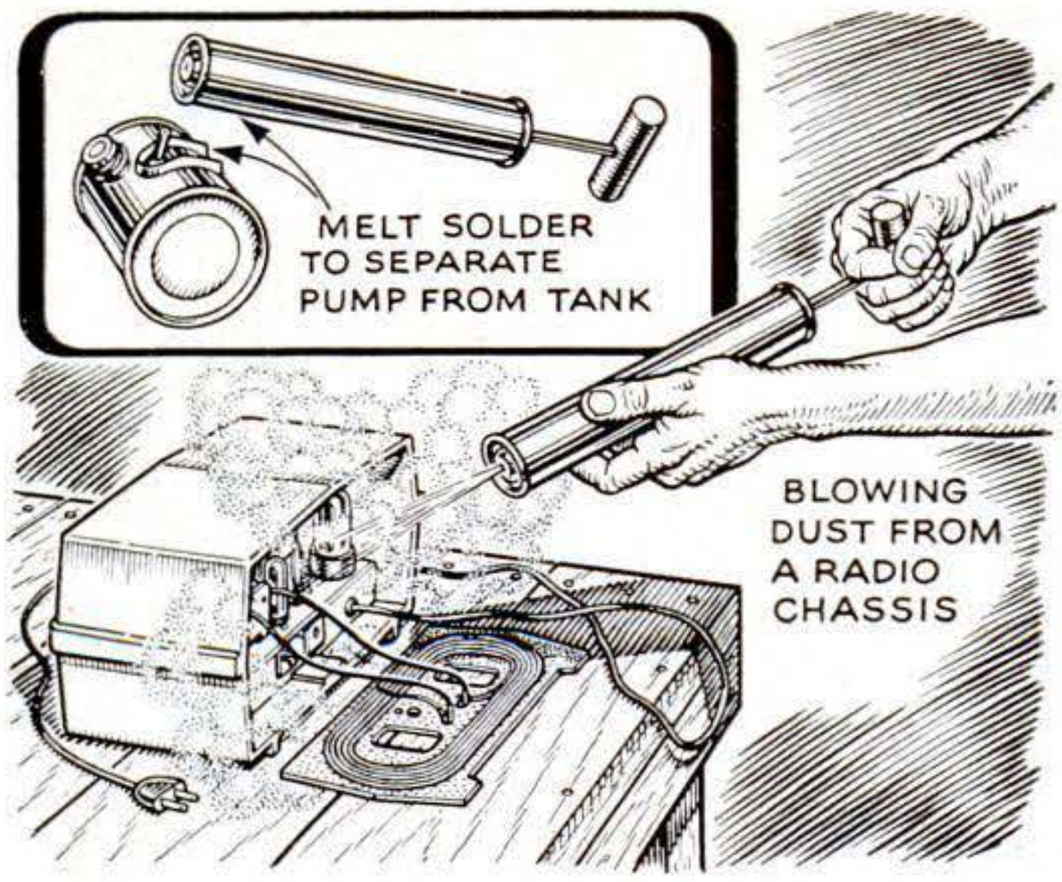
PREPASTED wallpaper cut into strips makes handsome tape for sealing Christmas packages. Just moisten the paste side with a sponge and stick it around the package.



Belting Protects Work in Vise

YOU can prevent damage to tubing or metal rod by padding the jaws of a vise with a piece of rubber or leather belting folded as above.—*Walter E. Burton, Akron, Ohio.*



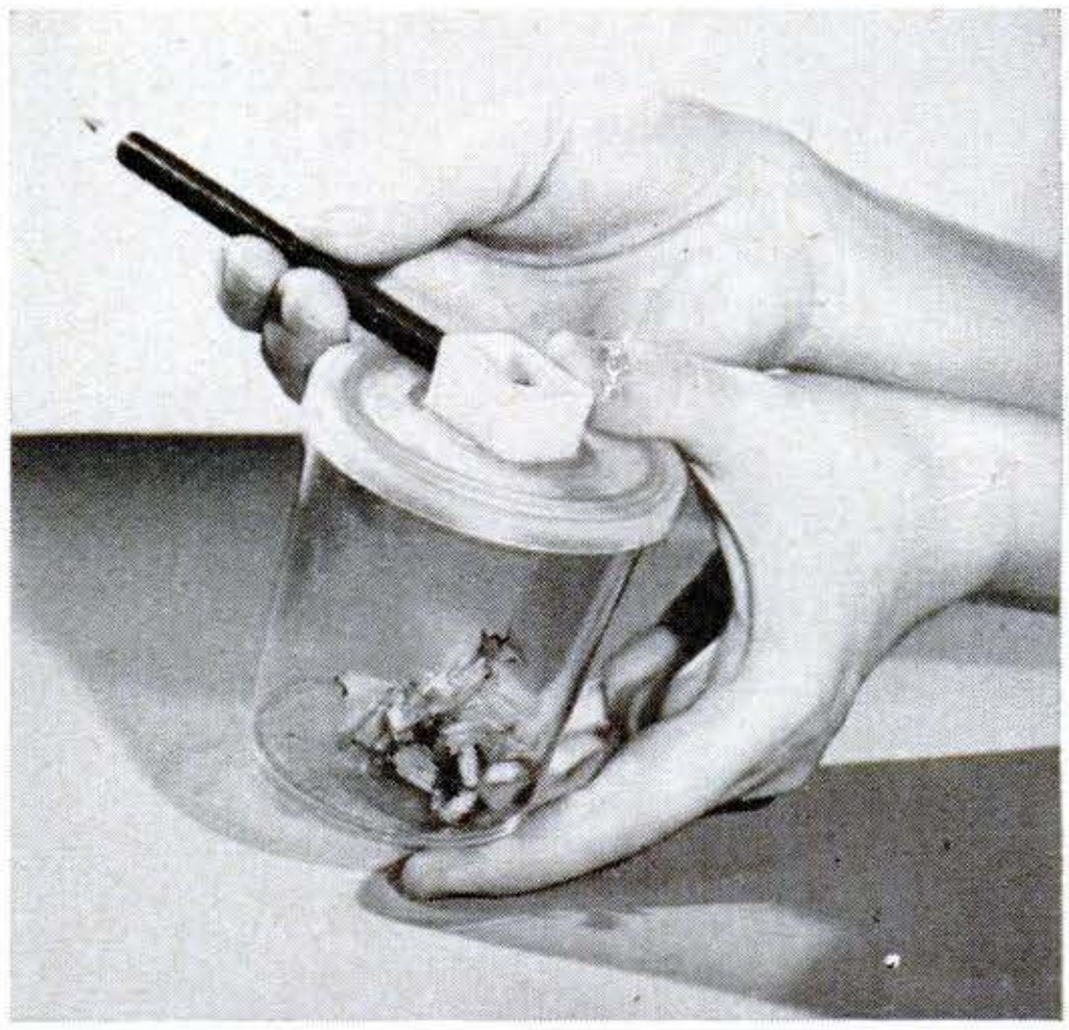


Fly Gun Blows Away Dust

DUST accumulations in a radio chassis or other hard-to-reach places can be blown out with puffs from an old insecticide sprayer. —*William S. Hart, North Royalton, Ohio.*

Eraser Cleans Rust Off Tools

NEED an abrasive for removing light rust on small tools? Try the coarser end of an ordinary ink eraser.—*Frank Shore, NYC.*



Jar Holds Pencil Shavings

ADD a de luxe touch—a shavings reservoir —to your dime-store pencil sharpener by cementing it to the cover of a plastic cheese container. Cut away the plastic under the sharpener when the cement is dry.

Squeegee Leads a Double Life

A RUBBER squeegee blade can be used twice as long if you reverse it—as shown at the left—when one side becomes dull. You'll find the unused back edge sharp and square.

Copyrighted material

FUEL'S PARADISE . . .

CARBURETORS BY ROCHESTER!

Gas mileage stretches out to a happy *maximum* when you install a Rochester Carburetor! Rochester does the perfect fueling job smoothly and efficiently, year after dependable year! That's why fuel's no stranger in *this* paradise! Cadillac, Buick, Oldsmobile, Pontiac and Chevrolet . . . *they depend on Rochesters!* Relax—get a Rochester on the job for you, today!

Insist on...

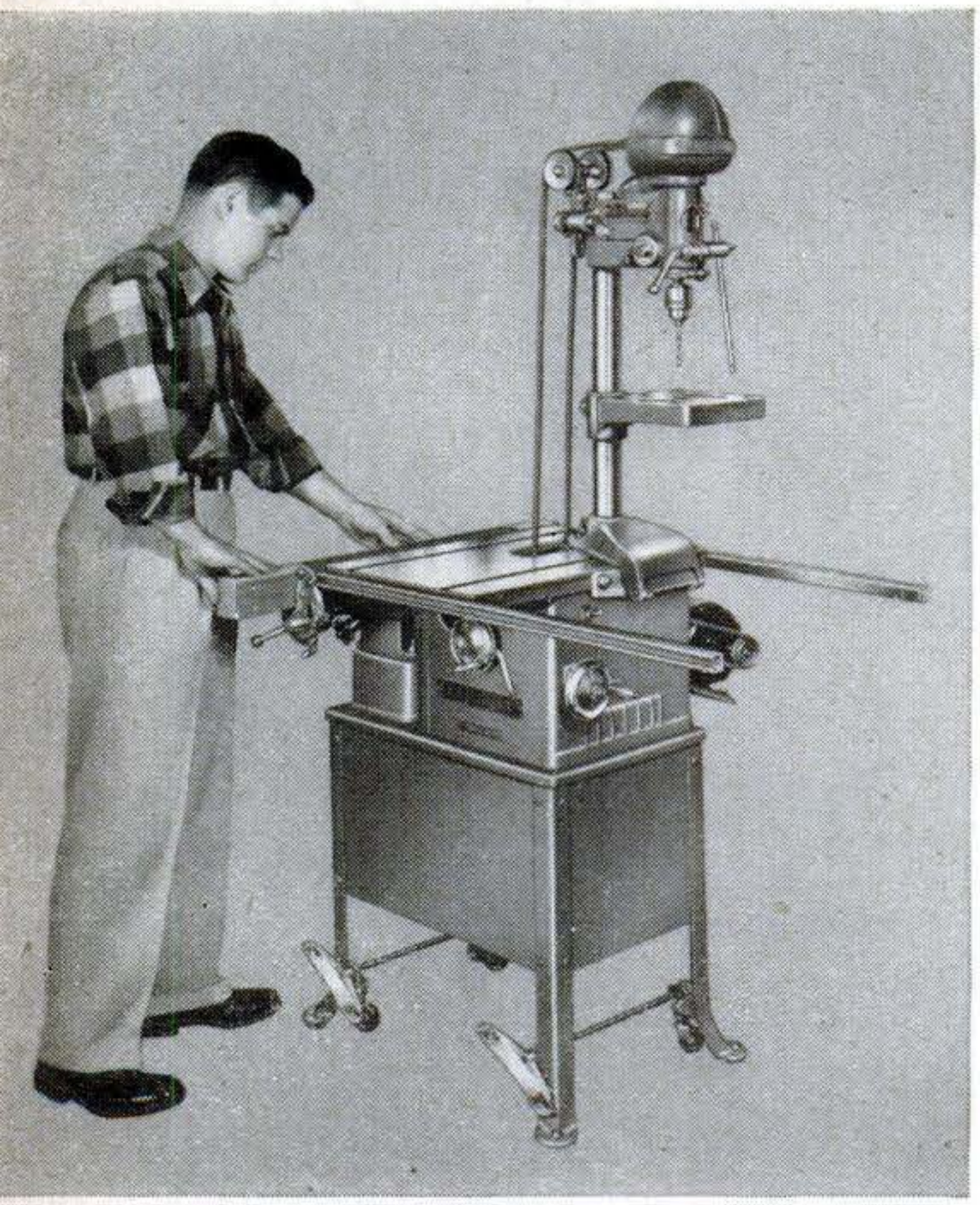
CARBURETORS BY ROCHESTER PRODUCTS

ROCHESTER PRODUCTS DIVISION OF GENERAL MOTORS CORPORATION ROCHESTER N.Y.

Copyrighted material

don't be "sold" ...get the facts

MAKE about



DELTA SHOP

Famous one-motor combination of full-size power tools

It's a Saw *It's a Jointer* *It's a Drill Press* *It's a Sander*

The ONLY right combination of basic power tools. The U. S. Chamber of Commerce says this about multipurpose tools: "The machine which is used most should be the basis of this tool . . ."

The DeltaShop is built around the Circular Saw—the basic, most-used woodworking tool. It also includes the full-size Delta Homecraft Jointer, Drill Press, and Sander. *Not* a collection of attachments, but a combination of real Delta Quality Power Tools operated on one motor.

Exclusive "Tool-at-a-time" Plan makes it easy to own. The DeltaShop is the *only* combination tool you can buy "a-tool-at-a-time," as your budget permits.

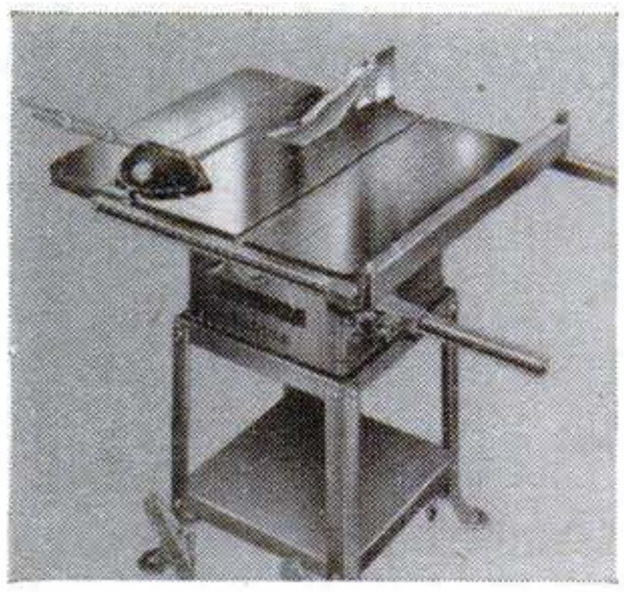
See the Exclusive Delta Saber Saw Attachment: Makes *curve* cutting machines of both the DeltaShop and the Delta 8" Tilting Arbor Saw! Unlimited capacity for internal and external curved work.

Individual Tools or All-Purpose Combination?

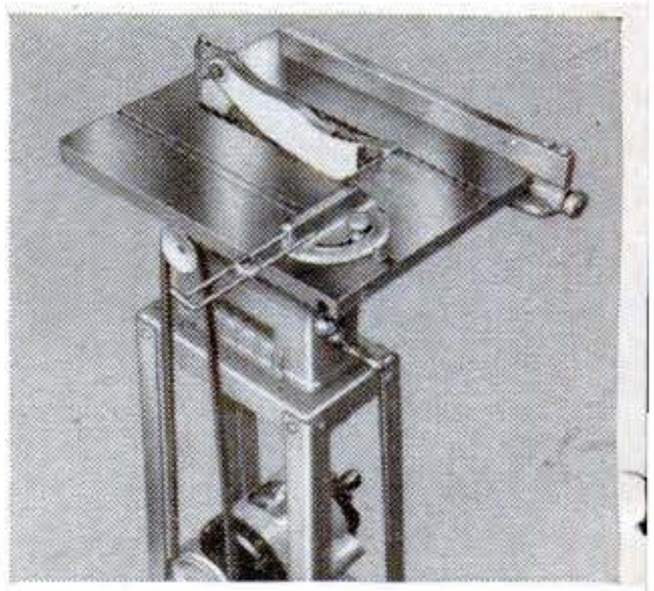
Which is best for *you?* Only you can decide that—after you have weighed the facts about your workshop space, the kind of work you want to do, and the condition of your pocketbook. But your Delta Dealer can help with *impartial* facts because Delta, oldest and largest power tool producer, makes *both* combination *and* individual tools to suit every need and budget.

Are All Power Tools Equally Accurate, Rugged?

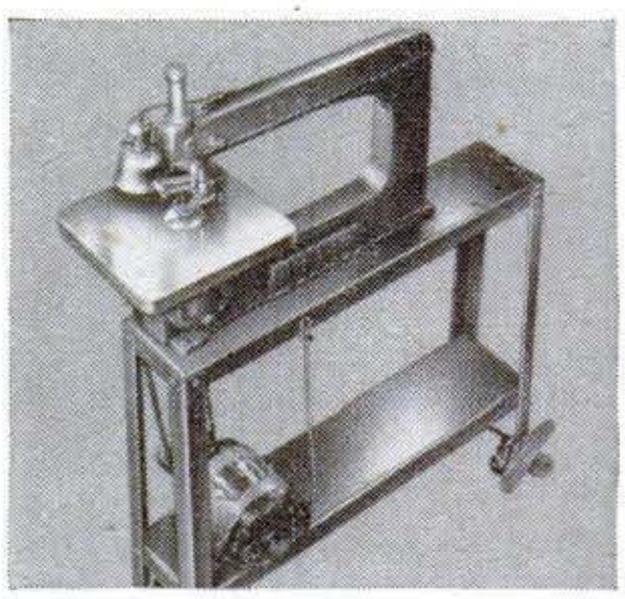
No, no more than all cars, TV sets or washing machines are equally good. The precision, economy, and fun you get *out* of a power tool depend on the skill, experience, and craftsmanship the *builder* puts *into* it. For many years, Delta Power Tools have set the standards of quality —and true economy—in thousands of industrial plants, school shops, and finest home workshops.



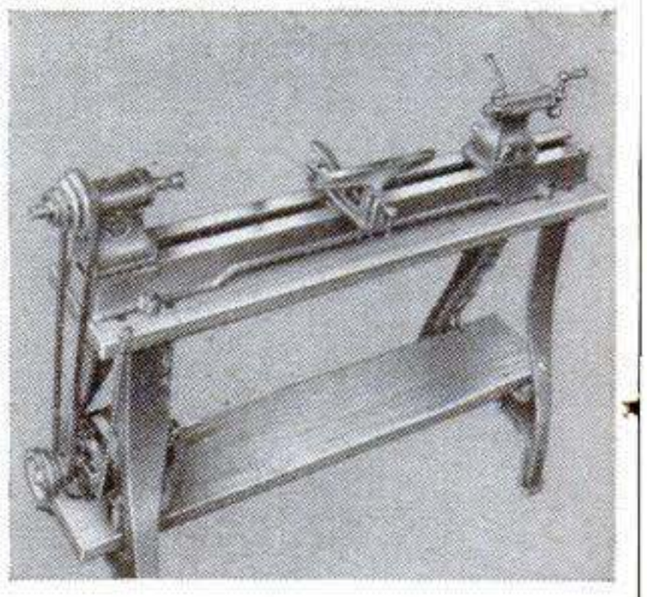
Delta Homecraft 8" Tilt Arbor Saw: The finest made for home shop use. Also available are Delta 10" and 12" tilting arbor saws.



Delta Homecraft 8" Tilt Table Saw: Gives you big saw results at small saw cost. Also available: Delta 10" tilting table saw.



Delta Homecraft 16" Scroll Saw: Rugged enough for Dad—safe enough for the children. Also larger 24" scroll saw available.



Delta Homecraft 11" Wood Lathe: Turns beautiful forms in wood, plastics, light metals. Delta 12" 4 and 16-speed models available.

DELTA ROCKWELL **world's most complete line of power tools**

for Home Workshops . . . Industry . . . Builders . . . Schools . . . Custom Shops

53 MACHINES . . . 246 MODELS . . . OVER 1300 ACCESSORIES

Copyrighted material

UP YOUR OWN MIND

the power tools best for you!

Are Power Tool Accessories Important?

Very—because the right accessories can almost double the usefulness of many power tools, at extremely low cost. And because Delta's 1300 accessories are designed as part of the world's most complete power tool family, many of them can be used with *several* tools. That's an added advantage you get from the "first family" of power tools.

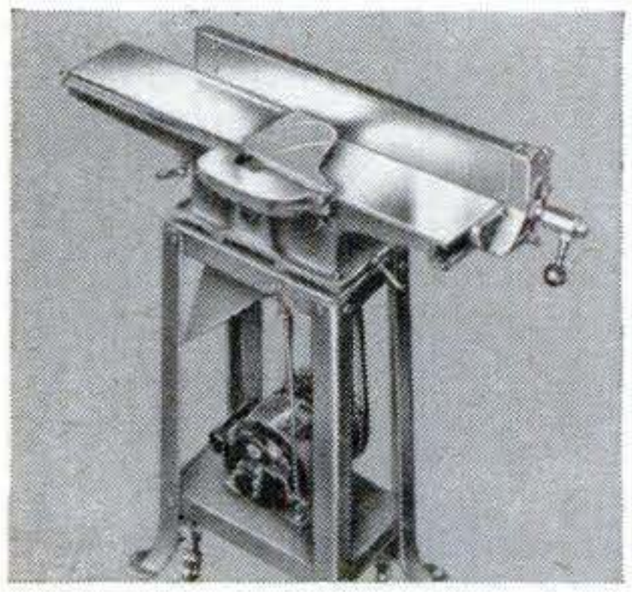
How Much Do Good Power Tools Cost?

Some brands are sold largely on price—but buying on price alone can be a very expensive "economy," if you don't get *value* for what you spend. Delta makes tools in several price ranges; which is best for you only *you* can decide. But of this you can be sure: any Delta Power Tool in any price range represents a real bargain *value!*

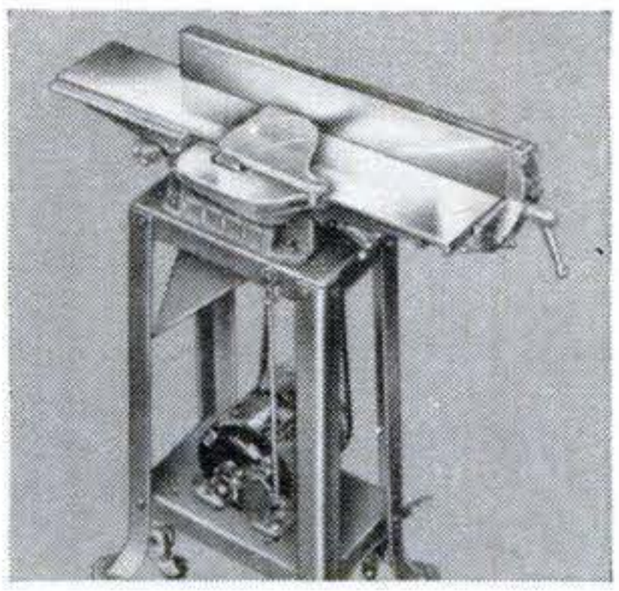
Let Your Delta Dealer Help You Get The Facts

Let him demonstrate the famous Delta-Shop, and individual Delta Power tools. Actually operate them yourself and see why Delta tools—at prices far lower than you'd expect, are the biggest power tool values in America. Then compare with any other brand of power tools made, and MAKE UP YOUR OWN MIND!

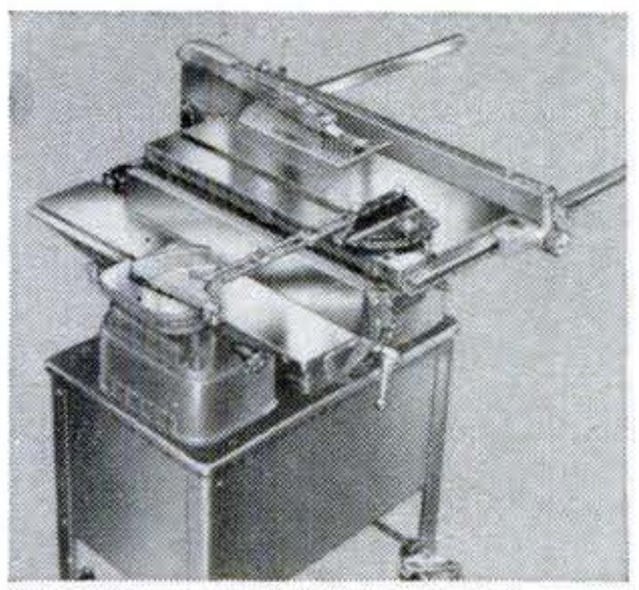
You'll find your Delta Dealer listed under "TOOLS" in the yellow pages of your telephone book, or you can see Delta Homecraft Tools at leading hardware and department stores. Send coupon for free fact book.



Delta Homecraft Deluxe 4" Jointer: Also available: Delta 4" jointers, 6" Long Bed jointer, and 8" Long Bed jointer.

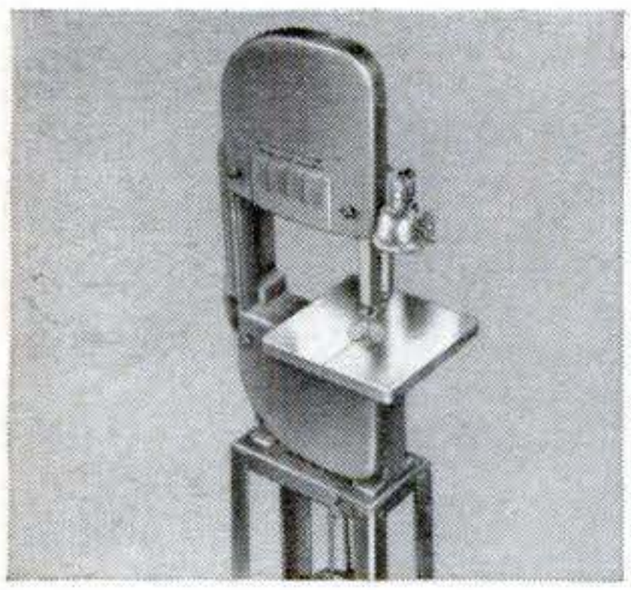


Delta Homecraft 4" Jointer: You get many built-in quality features found in larger Delta jointers—at exceptionally low cost.

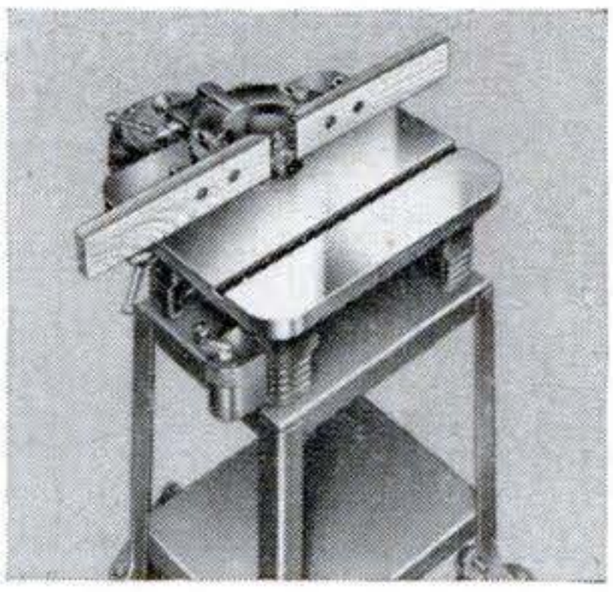


Delta Homecraft Saw-Jointer: Combines 8" circular saw and 4" jointer on one stand with one motor. Larger model available.

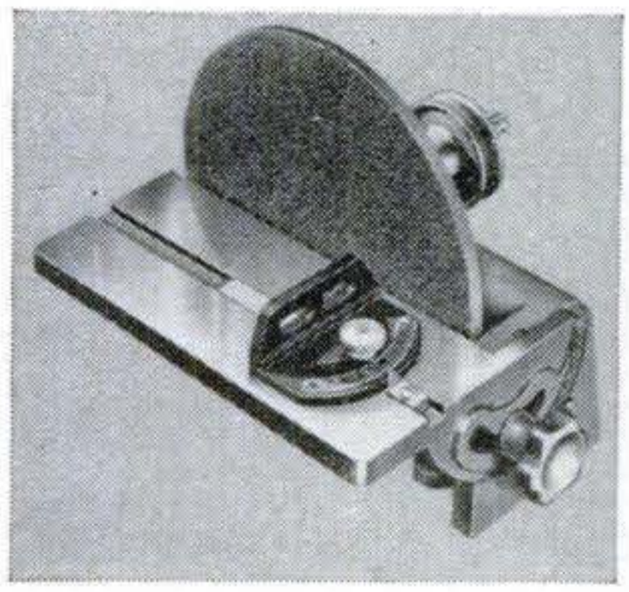
Delta Homecraft 11" Drill Press Do countless jobs with this multi purpose tool. Delta 14" and 17 models also available.



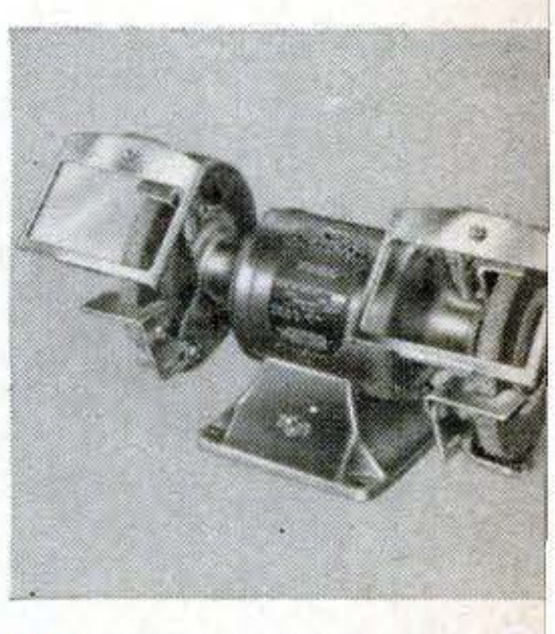
Delta Homecraft 10" Band Saw: Curved and straight line cutting even in hardwood. Delta 14" Band Saw also available.



Delta Homecraft High Speed Shaper: Makes smooth, professional-looking shaped edges. Larger shaper also available.



Delta Homecraft 8½" Disc Sander: Finishes wood, plastics, ivory, non-ferrous metals satin smooth. Larger model available.



Delta Homecraft General Purpos Grinder: Sharpens, buffs, polishe —has many other uses. A sense tional value at its low price.

SEND FOR FREE FACT BOOK NOW!

DELTA QUALITY POWER TOOLS

Another Product by **ROCKWELL**

DELTA QUALITY COSTS NO MORE!

Delta Power Tool Div., Rockwell Manufacturing Co.,
504M N. Lexington Ave., Pittsburgh 8, Pa.

- ☐ Please send me free, illustrated booklet on Delta Power Tools.
- ☐ Please send me names of Delta Dealers nearest me.
- ☐ Please send catalog of Delta literature on power tools, plans, and projects.

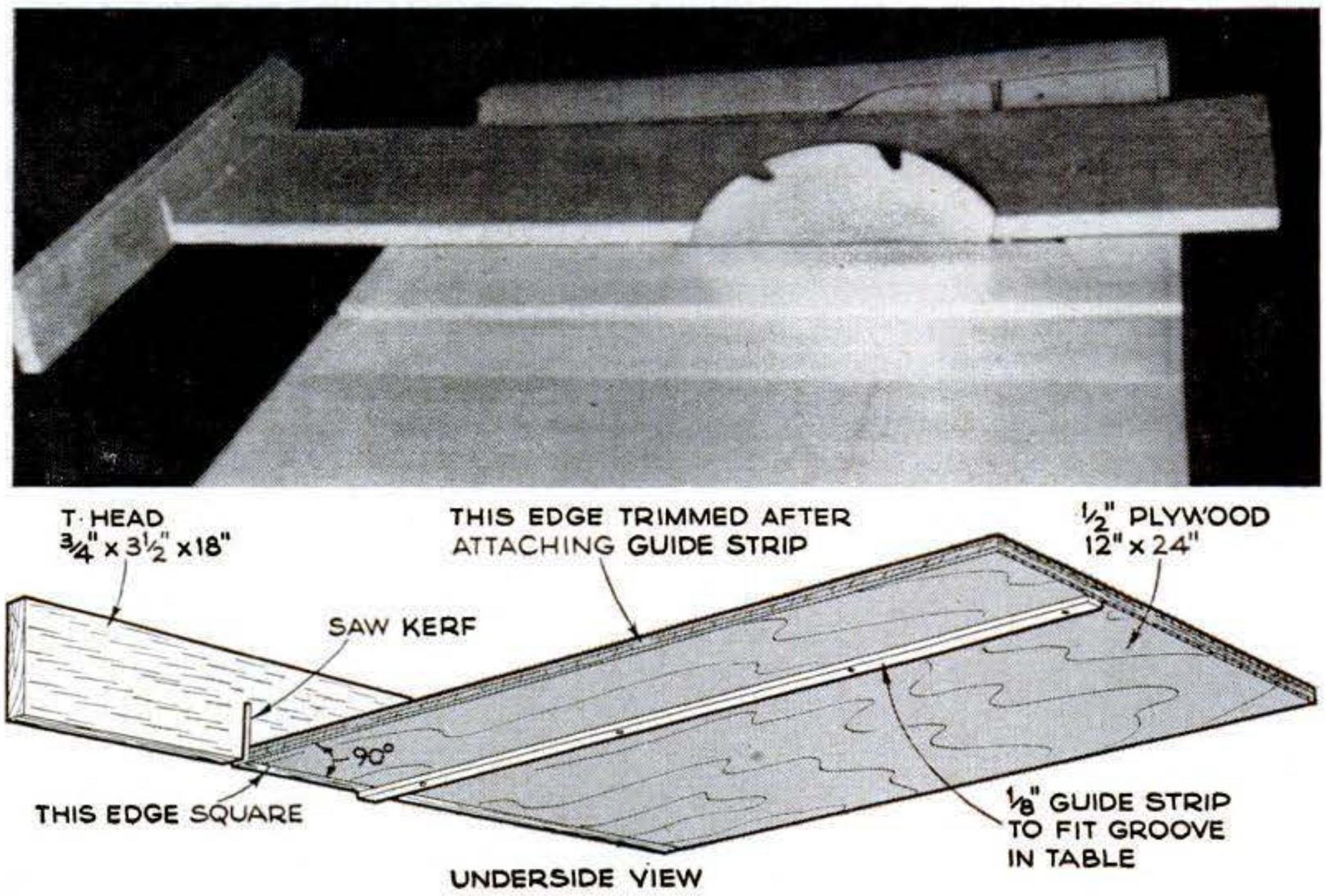
Name_____

Address_____

City_____ County_____ State_____

Copyrighted material

Jig Carries Wide Board Across Saw as You Make a Cut

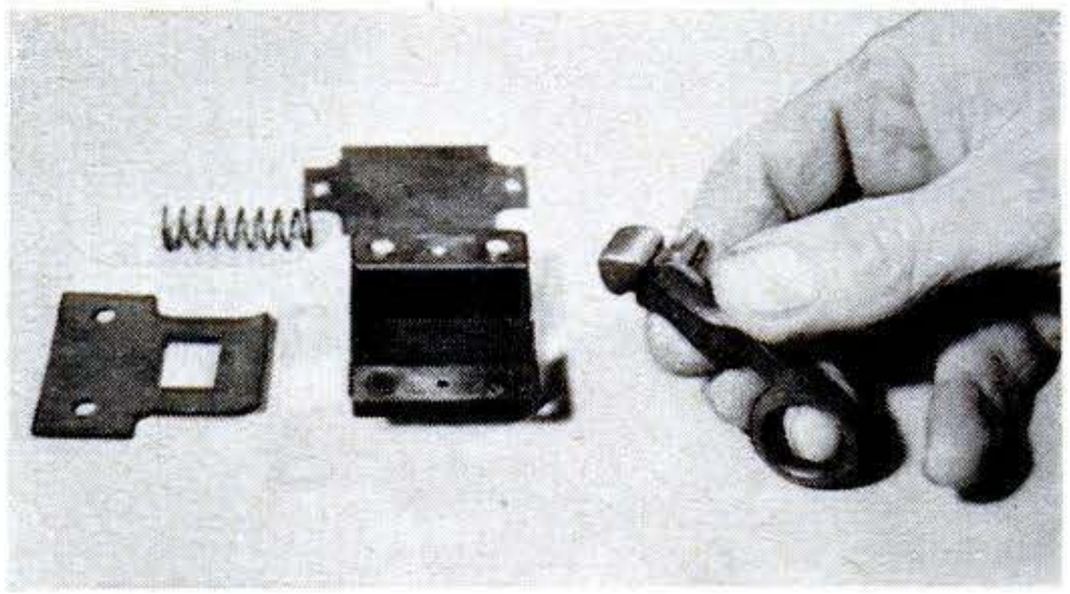


A REGULAR miter gauge is often inadequate for guiding wide boards when cross cutting. This jig provides a wide head for squaring the work and it actually carries the board across the saw table, preventing it from sliding sideways or running askew during the cut.

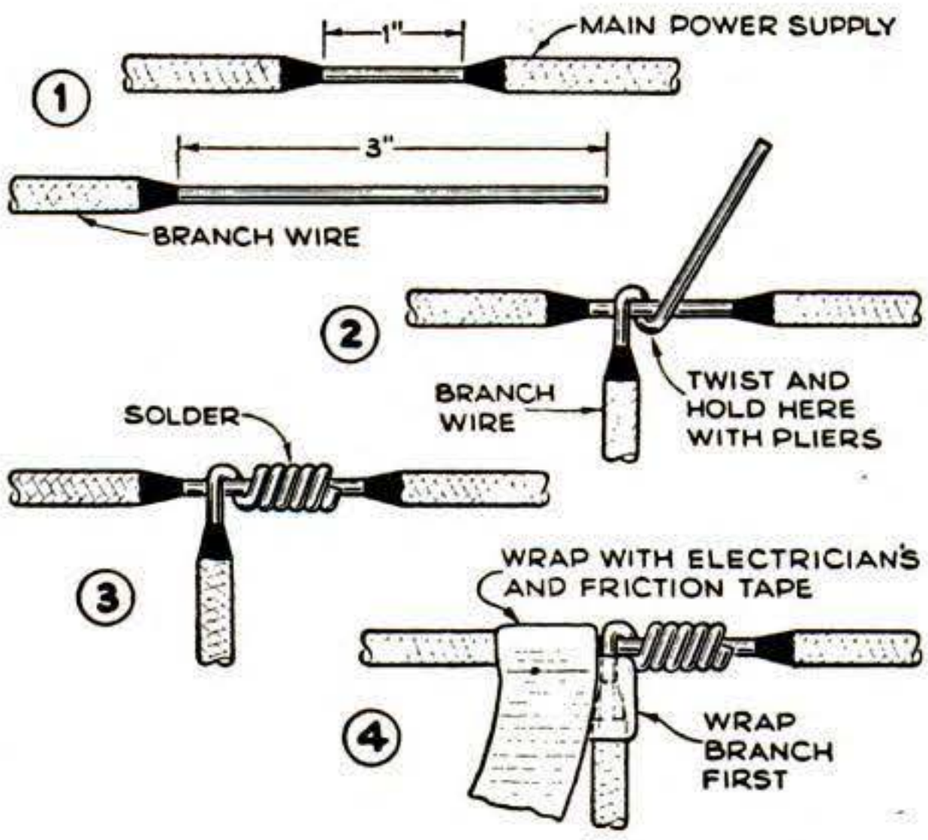
Select a flat piece of ½" plywood and glue a guide strip to its underside to run in the saw-table groove. Trim the right edge of the plywood by running it through the saw with the guide strip in the groove. Cut the trailing edge square to this edge and screw a straight board to it for the T head. In use, line the work up with the edge of the jig, press it firmly against the T head and then simply slide the improvised jig across the table.—*A. T. Halbing, Waterbury, Conn.*

Two-Slope Catch Is Automatic

A CUPBOARD latch becomes a friction catch—a simple movement of the door will open or close it—if you cut a second slope on the end of the bolt. Shape the slope so that the bolt slides in and out of the striker plate when the door is moved in either direction. A little car-door lubricant will help.—*Walter E. Burton, Akron, Ohio.*



ELECTRICAL, BRANCH SPLICE



THE branch, or tap, splice is used to make a connection to a main power wire. In making this or other splices, cut the insulation at an angle at the points where it is removed.

After flowing solder on the twist for a good electrical contact, wrap the splice with tape, beginning with the branch and then covering the bare section of the main power line. Build up an insulating covering with electrician's tape, stretching and overlapping it until the covering is at least as thick as the original insulation. Then cover this with one or two layers of ordinary friction tape.

FOR YOUR *POPULAR SCIENCE MONTHLY* INFORMATION FILE.

Copyrighted material

Finest drill of its type. Drills 1" holes in wood, ¼" in metal—and sands, polishes, removes paint. **No. 1814 Drill** with Jacobs Geared Key Chuck . . . **$25.70**

New self-powered Orbital Sander will sand in any direction without tracking, scoring or burning. **No. 580 Orbital Sander,** regular $44.95 value. **Special for Christmas . . $39.95**

Fastest-cutting jig saw made

Actually 6 saws in one. Cuts wood, plastic, metal; cuts own starting hole in wood. **No. 480 Jig Saw** with 4 assorted blades, regular $44.95 value, **Special for Christmas . . $39.95**

There's something *Wonderful* here FOR EVERY MAN ON YOUR LIST!

START A COMPLETE POWER WORKSHOP WITH THIS 4.0 amp. ⅓ h.p. 888 POWER UNIT

The Gift that keeps growing! This husky Power Unit comes completely equipped as a ⅜" drill, 6" sander and polisher. The inexpensive but beautifully engineered attachments listed below can be added any time to make a complete Power Workshop.

Special for Christmas . . . **$39.95** Regular $44.95

with Jacobs Geared Key Chuck

TO MAKE IT EASY FOR YOU

Add these for a fraction of the cost of individually powered tools

"Dyno-Mite" Power Workshop
You — or the lucky recipient — can convert the sensational **888 Power Unit** to a whole workshop of power tools by adding these specially designed inexpensive attachments — including a 6" Portable Circular Saw, an Orbital Sander, a Portable or Bench Jig Saw, a Bench Sander, Bench Grinder, 6¼" Circular Bench Saw, and a Drill Press. Ask your dealer to show them to you.

Your dealer now has a special group of Millers Falls Tools in Xmas packages. And ask him for the special Millers Falls Xmas folders. Or write us direct.

For power and performance

GIVE... MILLERS FALLS TOOLS SINCE 1868 ®

DYNO-MITE ®

MILLERS FALLS CO., Dept. PS-10, Greenfield, Mass.

FINEST POWER TOOLS MADE

Copyrighted material

[*Continued from page 152*]

"Ho, ho," Gus roared jovially, slapping Stan so enthusiastically on the back that he staggered. "And how are my reindeer, my good lad?"

WITH tools in hand, Gus racked his memory for the details of the heating unit as he had gone over them at the time of purchase. He checked the high-tension ignition points, took out the tiny, high-pressure oil-spray nozzle and cleaned it, the children gleefully following his every move. He experimentally turned the heat-limit control switch from "automatic" setting to "manual." The hot-air fan started.

"Santa's fixed it," the children cried in unison.

Gus beamed on them, even though he knew that by starting the fan manually he had merely sent a current of air upstairs from a cold and flameless burner. He turned the switch back to automatic control. He now inspected the primary control switch, which was mounted in the furnace stack. This, he recalled, was primarily a safety device, with a heat-controlled bimetallic coil. It was so constructed that it would turn off the burner within a minute or so after it started to run if the burner didn't ignite in that time to bring heat to the stack. Gus noted that the re-set button on this switch was out. A crafty look came into his eyes as he pressed the re-set button.

The burner whirred, but without flame. It ran a minute or more and stopped.

Aha, Gus thought, he had either ignition trouble or no oil at the burner. Now at least he knew where to start. The ignition points seemed all right—he'd bet this rig was out of fuel.

"You, there," he bellowed, pointing a finger at Sam Howard. "Have you got fuel in your tanks?"

"Of course I have," Sam said. "In fact, the left-hand tank is full."

There went another theory, Gus thought grimly.

"I know the left-hand tank's full," Sam went on, "because I turned off the right-hand tank a couple hours ago when it ran dry, and turned on the left, which ain't had a drop used out of it since it was filled. It holds nigh on to 600 gallons."

"So," Gus breathed, forgetting for the first time to use his Santa Claus voice, "the right-hand tank ran dry, did it, and you turned on the left."

"Maybe Santa can't fix our fire," a small voice—Ann Trotter's—said.

"He can, too," Tommy Willard said stoutly. "Santa can fix anything. Can't you, Santa?"

"Well," Gus said thoughtfully, stroking his beard, a twinkle in his eyes, "I haven't got all my magic tools from the North Pole. But if I had a plain, ordinary tin can, I just might do the trick that I have in mind."

"Tin can!" sputtered Matt Bergstrom, who had just come into the basement. "Tin can! Find him one, Sam."

SAM found a tin can that had once held liquid soap. Gus put it beneath the burner-regulating valve and backed off the bleeder plug. He pressed the re-set button on the primary switch. As the burner ran, it pumped out some oil—and along with the oil, the air lock that had been created when the right-hand fuel tank ran dry, and the left-hand fuel was forced in upon it.

Gus shut off the bleeder plug before the burner stopped. He waited a couple of minutes and then pressed the re-set switch again. This time when the burner started Gus heard the roar of flame in the furnace pot, felt the swelling of heat.

"Santa fixed it, Santa fixed it!" the children cried, dancing around Gus.

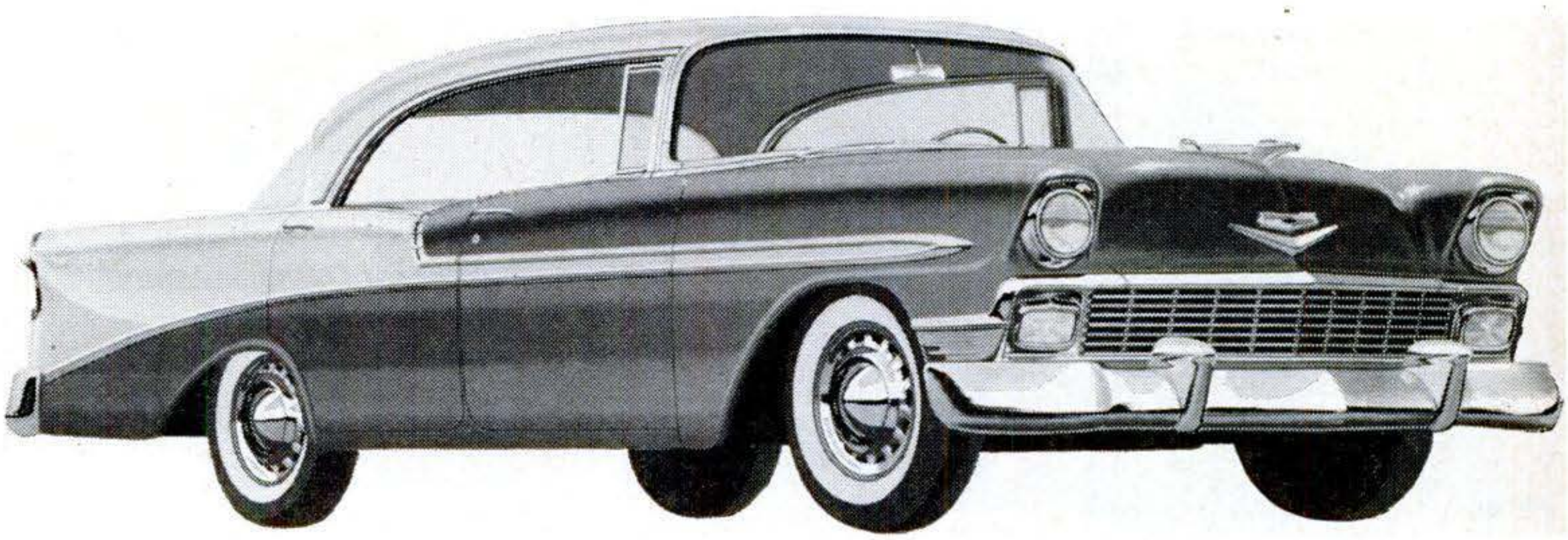
Standing there, Gus lifted his eyes and sent up his own private, Christmas Eve prayer of thanks that as an automobile mechanic he had known all about air locks in fuel lines. END

NEXT MONTH: Gus follows a cold clue.

Copyrighted material

The hot one's even hotter!

'56 Chevrolet



THE BEL AIR SPORT SEDAN—one of two new 4-door hardtops.

It's the new 1956 Chevrolet—with bold new Motoramic styling . . . frisky new models . . . and more of the dynamic action that's zoomed its way into America's heart!

They're here—and even *hotter!* That's the word on the new '56 Chevrolets.

They offer new higher horsepower—ranging up to a top of 205! This is the car, you know, that smashed the Pikes Peak record! That's *proof* of the kind of performance that puts more safety and fun in your driving.

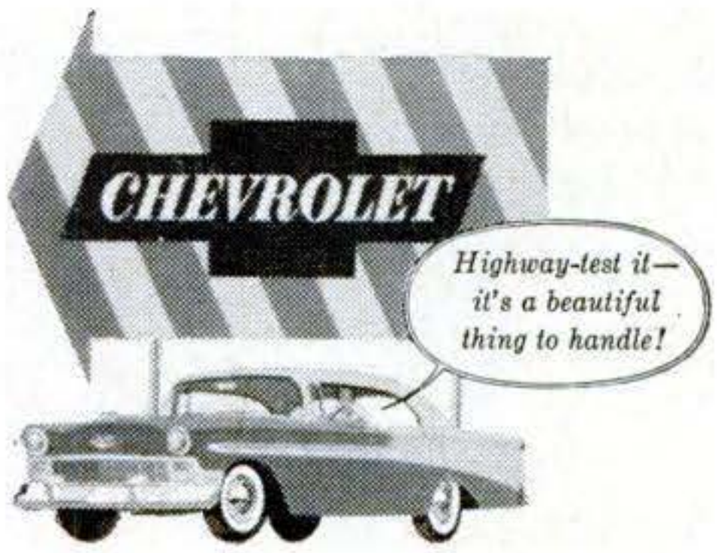
And look at that sassy new Motoramic styling—the lower, longer hood, the bold new front-end and sweeping chrome. See the new flaired fender openings and high-fashion taillights. (The left-side taillight hides the gas cap!)

The fun's at your Chevrolet dealer's. So, why wait? . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

The new "Two-Ten" 2-door Sedan

The new 9-passenger Bel Air Beauville

The new Bel Air Convertible



Copyrighted material

YOU CAN MAKE HER KITCHEN

Easier to work in!

Your wife's kitchen is her "workshop." That's where she proudly exhibits her cooking skill. If she could only be rid of the cleaning-up afterwards!

You can put *your* skill to work and reduce her cleaning of work-surfaces to next-to-nothing . . . by installing St. Regis Panelyte. This smooth, hard surface goes on easily, over the sink, counter and tables.

Your wife will find that it resists all stains from foods, spilled liquids, boiling water, grease.

Patterns are modern, colors lovely. "Easy to Apply" St. Regis Panelyte comes in a special 1/10" thickness you can work with simple hand tools or 1/16" thickness used with Panelyte contact adhesive.

See it at your building materials or floor coverings dealer's.

SR ST. REGIS PANELYTE THE MODERN SURFACE

Send for FREE "Do-It-Yourself" Booklet

PS-1255

St. Regis Paper Company, Panelyte Division
230 Park Avenue, New York 17, N. Y.

Send FREE instruction booklet to:

Name.....

Street.....

City.....Zone.....State.....

First Aid for Universal Motors

[Continued from page 173]

drill housing itself grounded by this wire, you'd get no shock, only a blown fuse."

"So how come I got one?" asked Bud.

"That is a stickler, isn't it? You think about it. Then we'll talk again."

As Bud left, Cam looked at the drill closely, grinned, and continued assembling my motor. Then he plugged it in.

It roared enthusiastically. "Sounds better than it ever did," I yelled.

Cam nodded, snapped it off.

"It'll do," he said, as Bud came over again. "Figured it out, Bud?"

"No-o. How could I have got a shock from the case when it was grounded, unless I was touching something hot?"

"You're getting warm," said Cam. "Matter of fact, you were. And you're the only one of us who could have. Here—grab the drill as if you're using it."

Mystified, Bud did so.

"Now look under your first finger."

Bud lifted it off the drill. As he stared, a grin spread over his face.

"What do you know? I'll have to tape that up until I can get a new one."

I'd had enough mystery. "Let's see."

The hot spot. Bud turned the drill toward me. "See that brush cap? I must have broken the insulation off it last time I put it back. The juice went through my finger, through my hand to the housing, and back by the ground lead to the meter."

"But the broken brush cap was the villain, not the ground lead," Cam pointed out. "Every electric tool should have such a lead. Just fasten a single wire under a bolt on some unpainted spot, tape it to the cord, and put on an alligator clip."

"Okay. But why is Bud the only one who could have touched this bare cap?"

"Oh, that—because it's the brush on the left side of the drill, and he's the only one of us who's left-handed. There's where he had it all over us in finding what was wrong."

"I did?" asked Bud innocently.

"Sure. Who else," asked Cam, with a wink at me, "could have put his finger right on the trouble?" END

Copyrighted material

PLYMOUTH

DODGE

The only factory-approved parts and

DE SOTO

CHRYSLER

accessories for Chrysler Corporation

IMPERIAL

DODGE TRUCKS

cars and trucks bear this name:

MoPar PARTS ARE AVAILABLE FROM YOUR NEARBY PLYMOUTH, DODGE, DE SOTO, OR CHRYSLER DEALER AND FROM BETTER REPAIR SHOPS EVERYWHERE

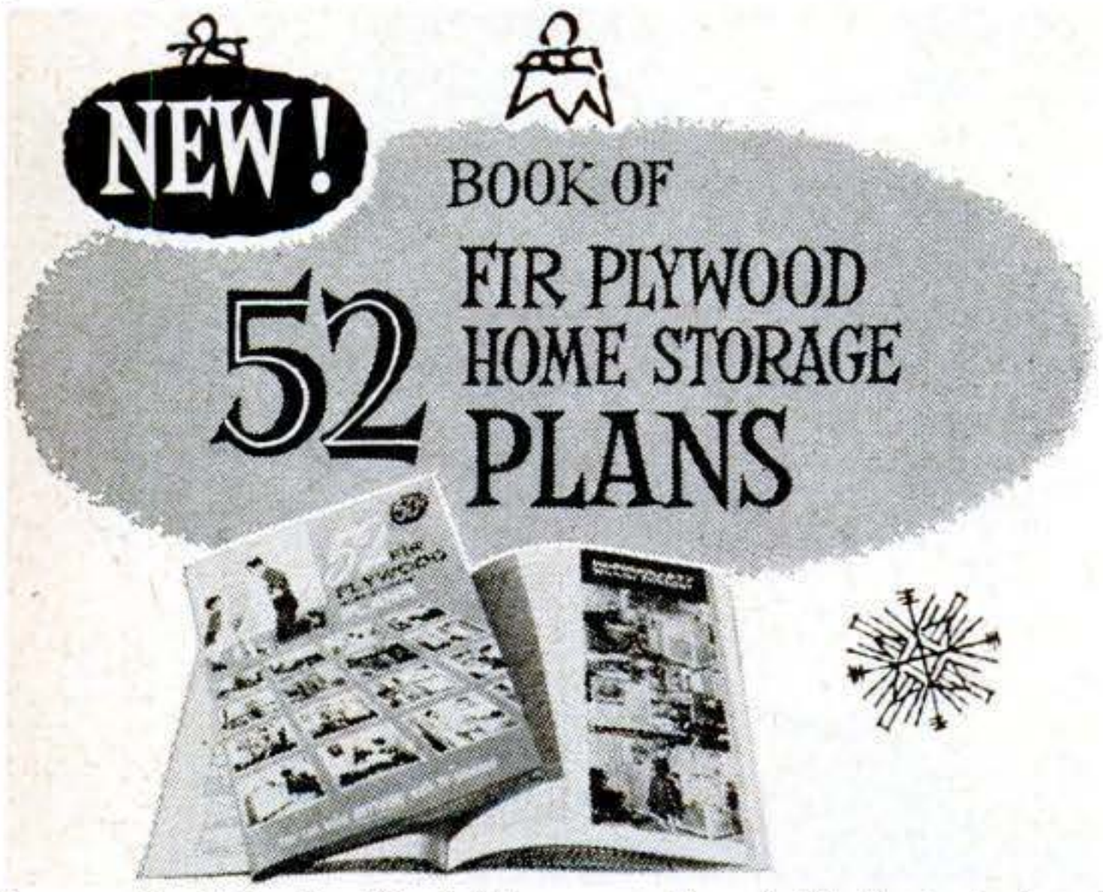
MoPar

PARTS DIVISION
CHRYSLER CORPORATION

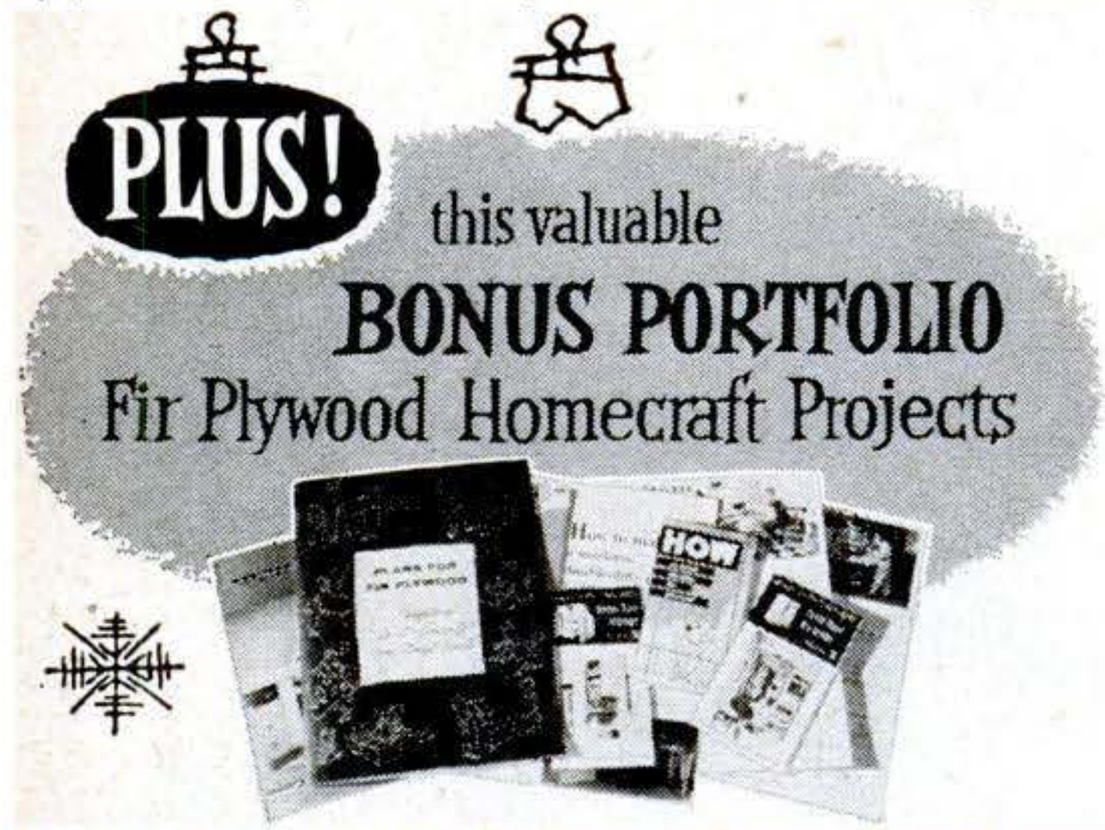
Copyrighted material

CHRISTMAS BONUS !

Two grand gifts for the price of one. Order now for every handy man on your list – especially if you're giving (or getting) tools for Christmas.



Bonus offer! Jumbo file folder assembly of 10 plans designed for "week-end carpenters". Step-by-step plans for Christmas toys, decorations, train tables, furniture and remodeling ideas.



Complete "how-to" bible for home craftsmen. Over 90 pages of easy-to-follow plans, photos, instructions for exciting new built-ins, cabinets, storage walls, many others. Ideas galore for every room, for garden and patio. Big illustrated "how-to" section contains scores of time and money-saving tips.

SEE YOUR LUMBER DEALER FOR FIR PLYWOOD

Order NOW to insure delivery by Christmas. Send 50c to DOUGLAS FIR PLYWOOD ASSN., Dept. 1112, Tacoma 2, Wn.
*Orders must be received by Dec. 31, 1955; good U.S.A. only.

Is It Noise or Music?

[Continued from page 215]

unevenly spaced holes, the air is chopped off irregularly, resulting in mere noise.

Rig a motor drive. If you do not have a drill press, you can drive the perforated record from any small motor. A sewing-machine motor is especially suitable.

For this, mount the disc on a shaft running in its own bearings. The drawing on page 215 shows how to do it.

Cut off ¾″ from one end of a wooden spool 1½″ in diameter. If you have an electric drill, mount this piece on a $\frac{5}{16}$″ bolt and chuck the shank. With the drill running, hold a rat-tail file against the spool edge to form a groove for the sewing-machine belt. If you have no drill, wrap two lengths of tape around the spool with a gap to form the groove.

Press the spool onto the squared section of a $\frac{5}{16}$″ carriage bolt 5″ long. Drive small wooden wedges between the bolt and the spool to center the latter. Slide on another washer or two, set the shaft into the bearings and run a nut up to the washers. If end play is excessive, insert more washers as required.

Put another washer outside the nut, screw the record on (the hole may be tight on the threads) and clamp it with another washer and nut. After lubricating the bearing caps, tighten them just enough to let the shaft run without slackness or binding. If the disc does not run true, insert cardboard shims.

Clamp or screw the bearing base to a flat surface and align the sewing-machine pulley with that of the disc. Use the sewing-machine belt to drive the rig.

Since your record will revolve at high speed, stand well out of line with it when it is spinning fast. And don't touch! You may be burned if you do, and the unmusical sound that follows will come from you and not from the record. END

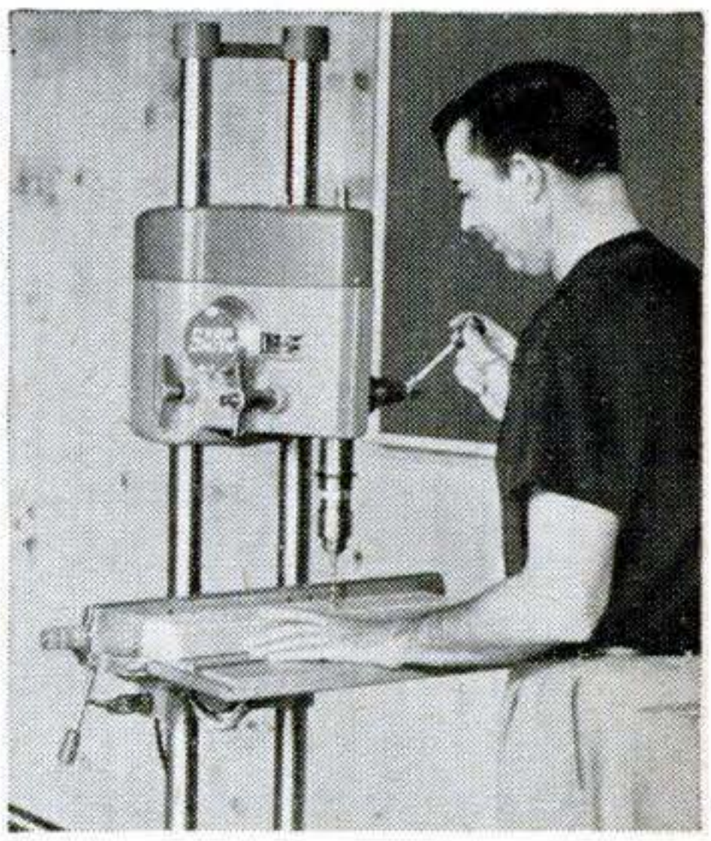
The one part of the human anatomy that continues to grow after 21 is the wishbone.

—THE SIDEWALK SUPERINTENDENT

Copyrighted material

The Merry Christmas present that gets you off to a Happy New Year—

SHOPSMITH



In vertical drilling—or any other operation—SHOPSMITH is accurate and foolproof. No job too big . . . none too exacting. Takes up no more space than a bicycle.

This present has a future! SHOPSMITH® will give years of fun and work-saving service in your home.

In one magnificent machine you get a saw, disc sander, vertical *and* horizontal drill, lathe. Motor is ¾ hp. and built in. Speed-Dial lets you choose *any* speed from 700 to 5200 rpm. SHOPSMITH'S twin-tube, fast-coupling Power-Mount lets you add jointer, jigsaw, and sprayer.

Make sure your Santa sees SHOPSMITH at your leading hardware or department store or any Montgomery Ward store. Place SHOPSMITH under your tree for as little as $3 per week. SHOPSMITH can earn back every penny of it!

MAIL COUPON FOR 3 FREE BOOKS

1. "Project Digest." 36 pages of modern wood-working projects.
2. The valuable home-shop guide: "What to Look for When You Buy Power Tools."
3. Illustrated 20-page SHOPSMITH catalog.

MAGNA Engineering Corporation

Dept. 307-A, *at factory nearest you:*
Waynedale, Fort Wayne, Indiana, *OR* Menlo Park, Calif.

Please send me the three free SHOPSMITH books.

*Name*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

If you already own SHOPSMITH, please check whether you have SHOPSMITH Mark 5 ☐, or SHOPSMITH Model 10 ER ☐.

Copyrighted material

LEE PETTY, ace stock car driver, says:

"This stuff can RUIN your car engine!"

Road dust, hard carbon and sludge can cost you plenty—if your oil filter is clogged

In 4000 miles your filter traps up to 3 pounds of abrasives and sludge . . . gets so clogged it can't stop more of this destructive grit from damaging costly engine parts. You need a new Purolator® Oil Filter! Up to 10 times more effective than ordinary filters, Purolator keeps your engine running cleaner, smoother, *longer*. Ask your serviceman to install a new Purolator Micronic® Refill *every 4000 miles*. Takes only minutes. From $1.60.

© 1955, Purolator Products, Inc., Rahway, N. J.; Toronto, Canada

9 out of 10 NASCAR racing drivers use

PurOlator

America's No.1 Oil Filter

[*Continued from page 112*]

It is doubtful that even a persistent follower of animated cartoons has seen animals doing all that these do, and the most observant naturalist has never reported such scenes. Beside a blazing fire, a possum works a bellows while a rabbit and raccoon warm paws and a skunk toasts his tail. A rabbit tosses salad, a raccoon and a squirrel consume sundaes and a raccoon cuts a cake.

A nine-inch frog—Silvestri's smallest moving character—touches his foot to ice on a pond, and withdraws it quickly. A turtle, a raccoon and a bear cub (on his tummy, kicking) gaze at fish swimming in the pond. An elf pulls a baby rabbit out of a brook. A possum skates, as do a raccoon, skunk, frog and turtle. A deer flicks at a snowflake on its nose. A baby raccoon and a squirrel make a snow bunny. A long line of animals coasts down a hillside on toboggans, sleds, bellies and tail bones. And there is an animal band.

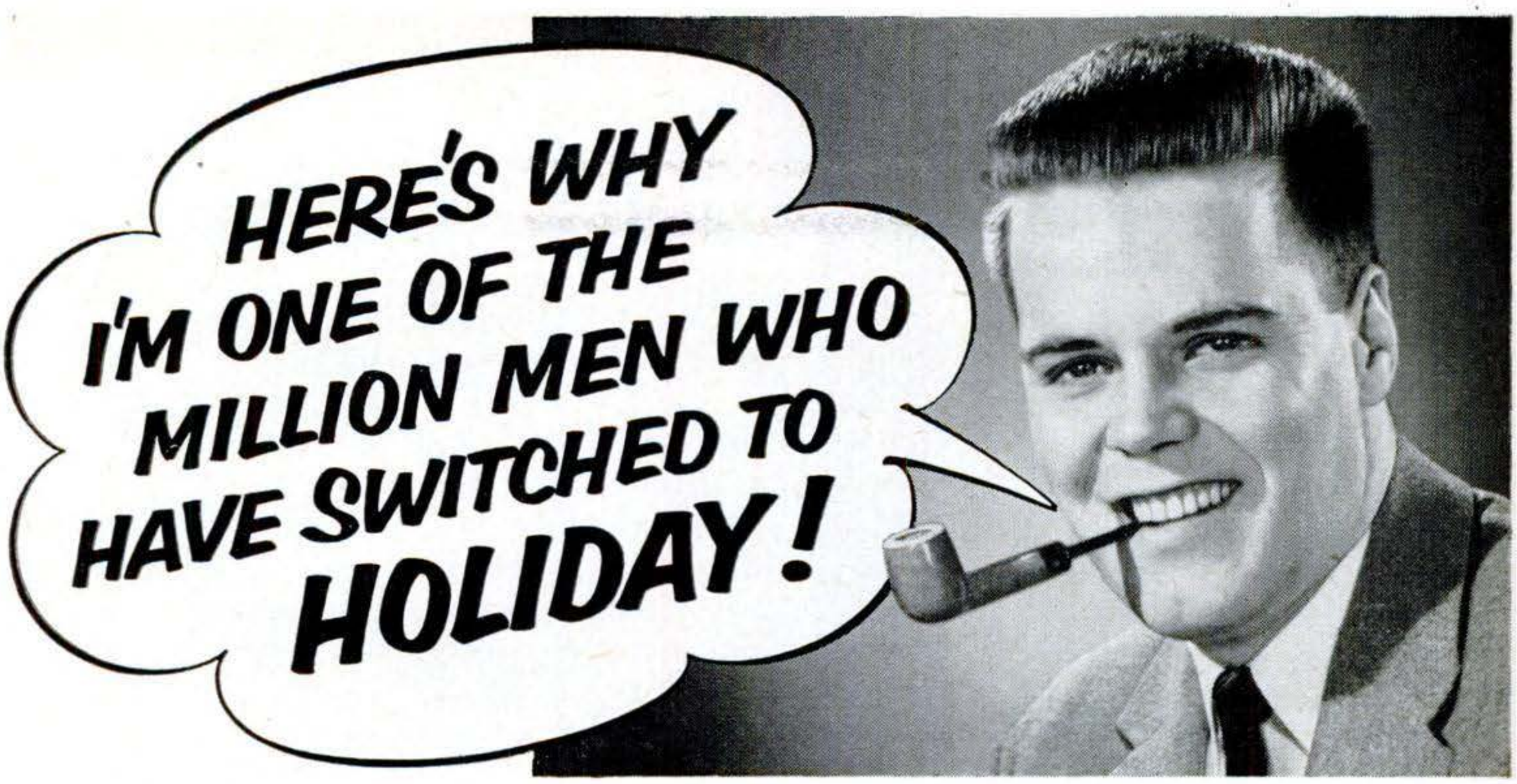
Silvestri's animal kingdom may be seen at, among other stores, Altman's in New York City, the O'Neil Co. in Akron, Kauffman's in Pittsburgh, Goldblatt's in Chicago, and the Boston Store in Milwaukee. It had a public preview recently at Filene's in Boston.

The Christmas Story. As told this year by Silvestri, the Nativity becomes a four-minute play, with words and music on tape synchronized with movements of the characters. A curtain across the window goes up. The Wise Men, shepherds and sheep march across the window, turn around and face a stage. Then a curtain on the stage rises to show Mary, Joseph and the Holy Child. The Star of Bethlehem meanwhile has grown brighter (by means of slowly opening shutters). The curtains fall. In a two-minute intermission, the characters back off, ready to begin again.

Small motors control the curtains and, by pulling chains under a slotted floor, move the characters. Spotlights go on and off to light the show. It's Silvestri's

[*Continued on page 240*]

Copyrighted material



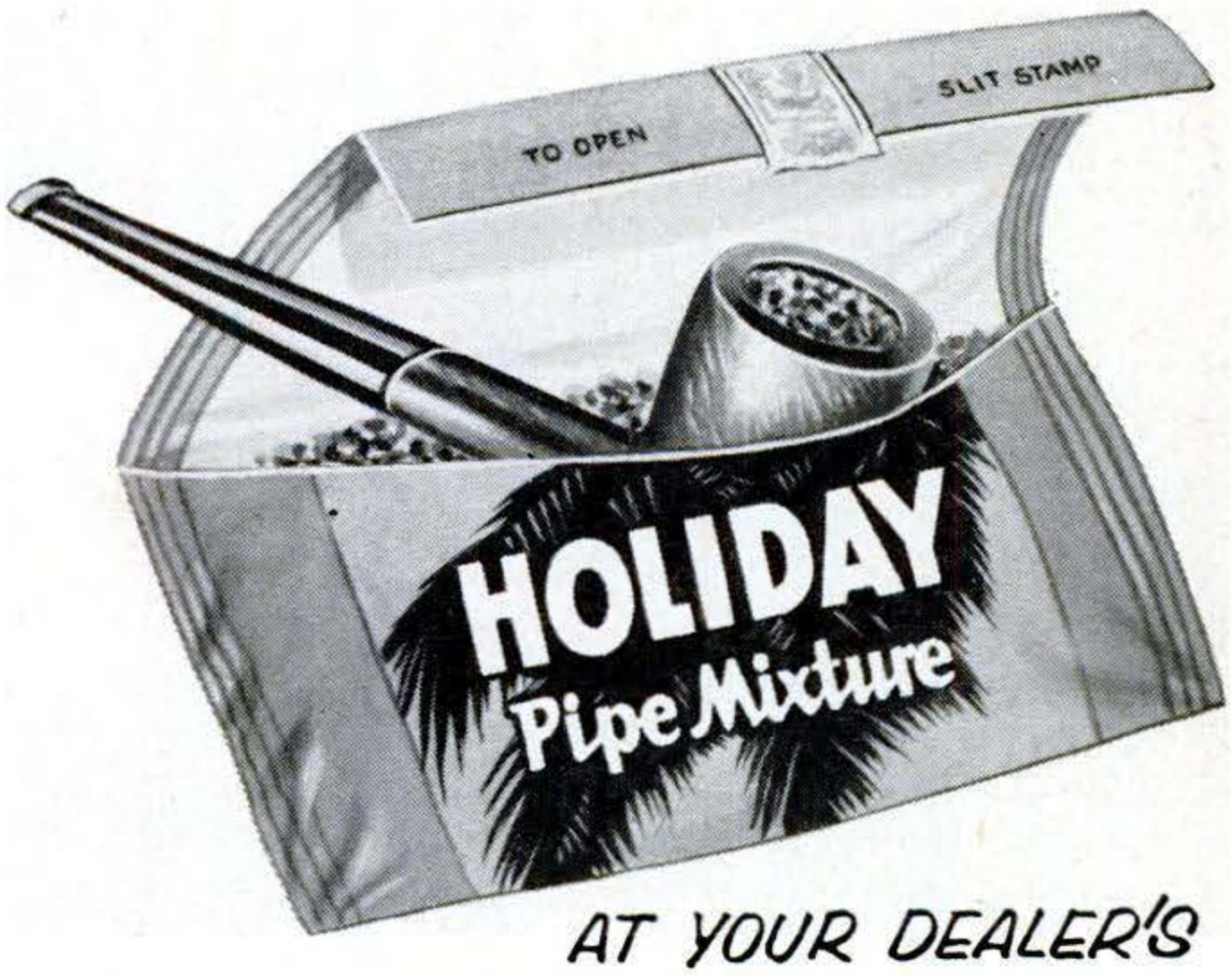
Only HOLIDAY gives you this Custom Blend for Mildness!

Yes, five famous tobaccos skillfully blended into a mixture of unequalled flavor, aroma and mildness. These fine tobaccos, selected from all parts of the world, are blended with a base of cool-smoking white burley . . . Each tobacco adds its own distinctive flavor and aroma to make Holiday America's finest pipe mixture. We suggest you try a pipeful . . . enjoy its coolness, flavor and aroma . . . and see for yourself why more and more men who smoke mixtures are switching to Holiday as a steady smoke.

These are the five famous tobaccos which give Holiday its mildness and aroma.

HOLIDAY gives you this Heat-Sealed Wrap-Around Pouch!

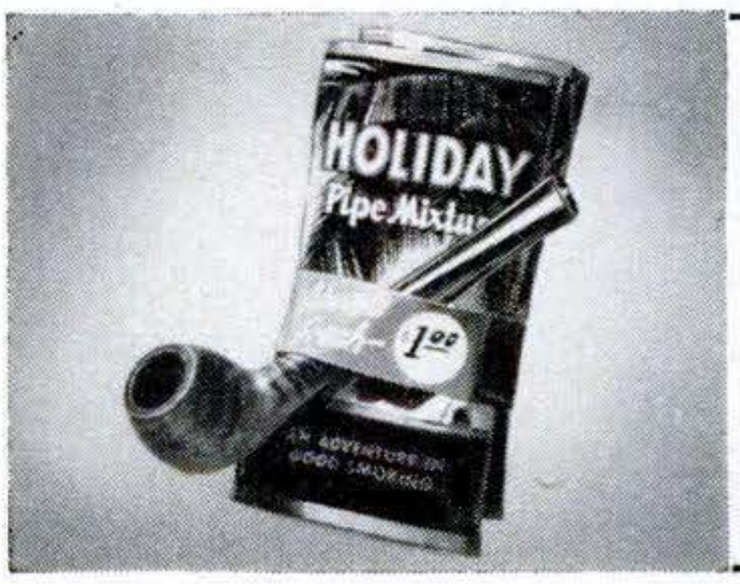
Holiday tobacco leaves our blending line with just the right moisture content. And it stays that way because Holiday is the only mixture which has the Wrap-Around pouch. Sealed air-and-water tight, it guarantees you a fresher, cooler-smoking tobacco.



AT YOUR DEALER'S

IF YOU PREFER A BLEND OF STRAIGHT BURLEYS

Try Edgeworth—choice cool-smoking white burleys in the air-tight pouch. America's finest pipe tobacco.



Get this guaranteed "Olde London" Pipe and two full-size pouches of Holiday tobacco for only $1.00. The pipe is fine, hand-rubbed imported briar . . . with genuine hard rubber bit . . . carbonized bowl for cooler smoking. If your dealer is unable to supply you, use this handy order blank.

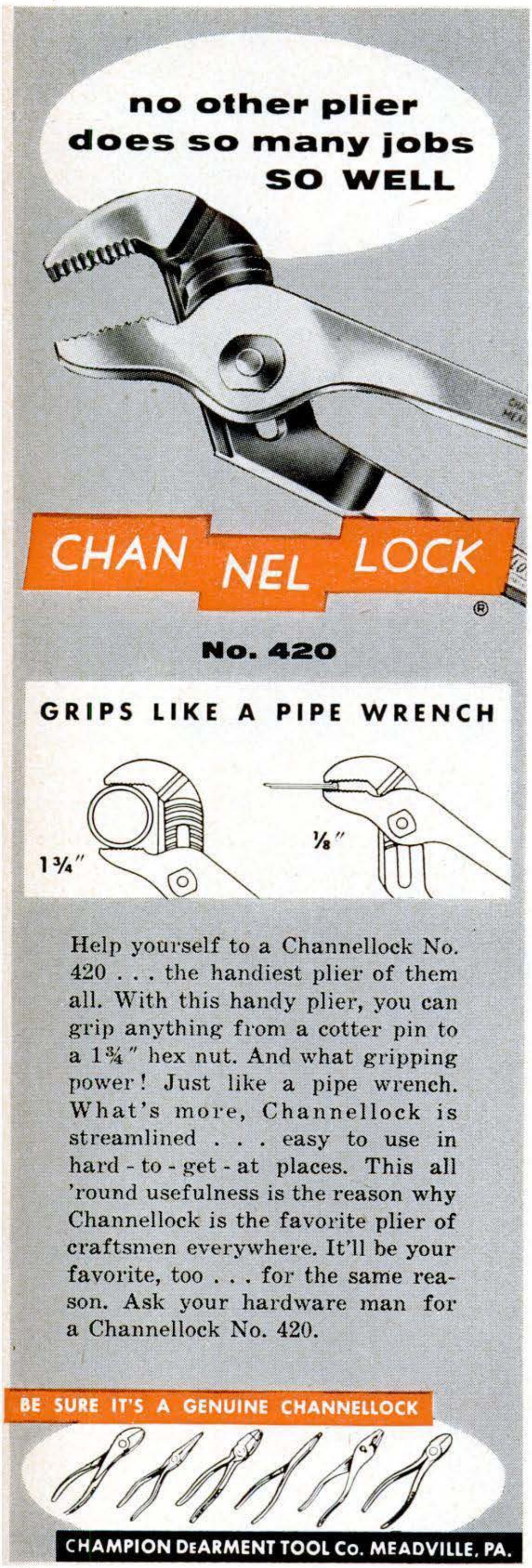
Name_____

Address_____

City_____ State_____

Mail with $1.00 to "Olde London," Larus & Brother Company, Inc., Richmond, Va.
Offer Good Only in U. S. A. **PS-12**

Copyrighted material



America's Favorite Christmas Windows
[Continued from page 238]

most complicated window, and he provides one of his own men to operate it.

The display is eight feet high, 12 wide and five deep. It costs $12,950. Jordan Marsh of Miami was the first to order it.

Country store. This one has to be seen to be believed, and you can see it at the Hecht Co. in Washington, D.C., the Eaton Co. in Toronto, Shillito's in Cincinnati and other stores.

Silvestri takes his ideas where he finds them. Last year someone sent a Christmas card picturing an old-time general-merchandise store to Eunice Milton, one of his artists. She sold Silvestri, and the result is a country-store interior big enough for you to walk into, or it can be split into units for several windows.

People have been walking through it. Silvestri's Chicago studio is open to the public. A mother, taking her children through his country store, saw a boy swiping cookies from a bin. "I told you," she said sharply, "not to do that. I'll spank . . ." Her voice trailed off: the boy was one of Silvestri's animated figures.

In this display a five-foot Santa—Silvestri's tallest animated doll—waits on a customer, talks to a girl, and has his young assistant, Sam, show her toys. The boy brings out a toy—a bird that moves and pecks. The girl, pleased, checks a name off her list as her dog barks and wags his tail with delight.

That's just part of the activity in this country store, which probably is busier than any such store ever was. A girl cranks an old-fashioned phone. A waitress brings sundaes to a boy and girl at a table. A boy points to candy, and a clerk weighs it out for him.

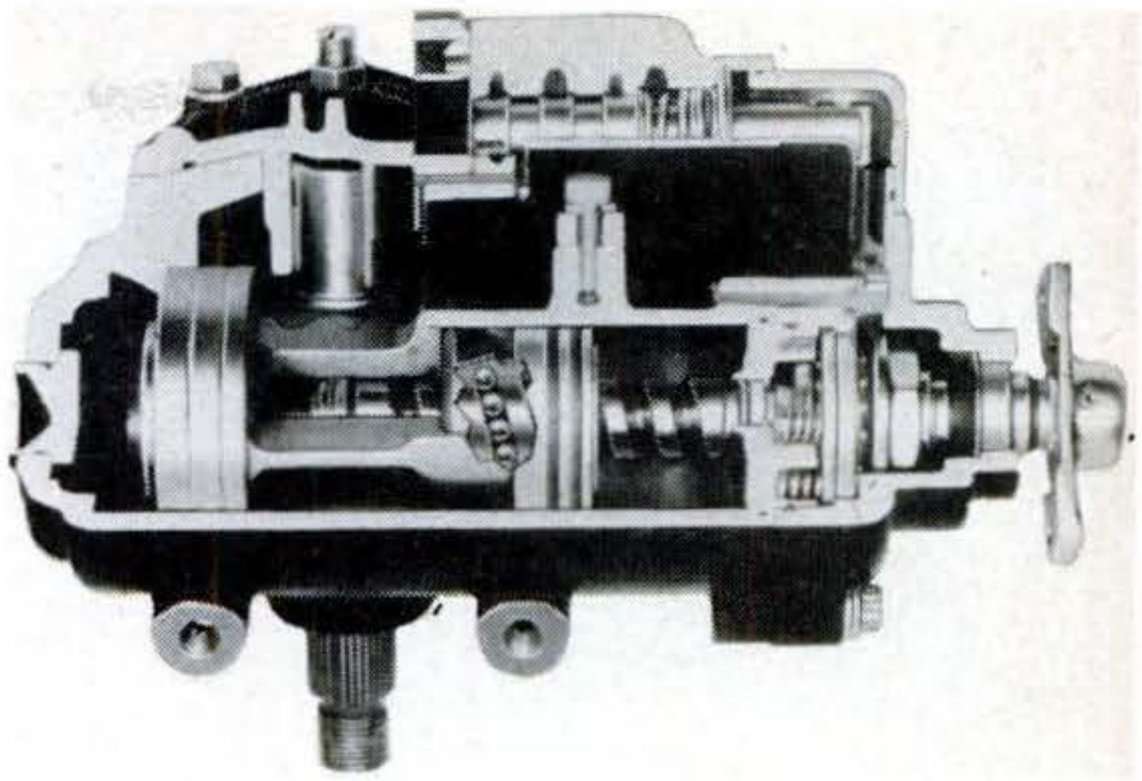
Silvestri's basic mechanism, used for all his moving dolls, is a fleapower electric motor. Usually it is under the floor, in a platform on which a doll stands, or (as in the case of the girl at the country-store phone) inside the phone box or other object. The tiny motor turns a camshaft, operating levers that move arms, legs, heads, and bodies of the dolls.

[Continued on page 242]

Copyrighted material

GM GENERAL MOTORS

ANNOUNCES THE WORLD'S FINEST STEERING SYSTEM

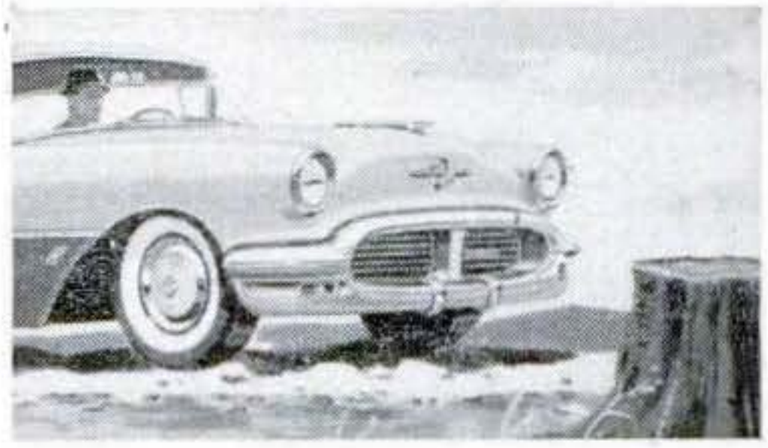


new Safety POWER STEERING

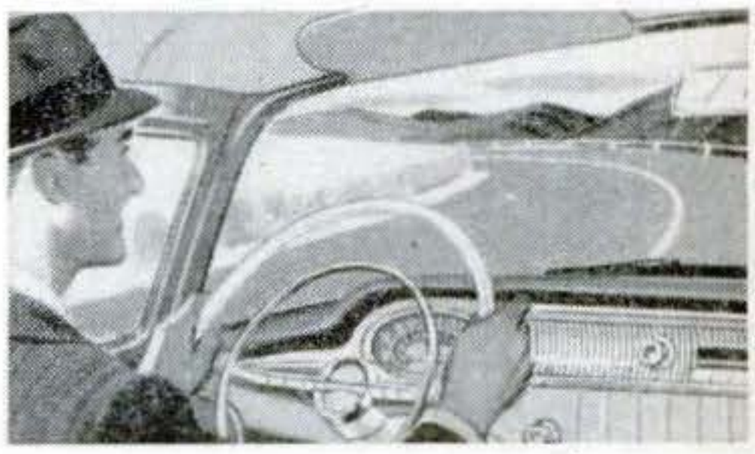
by Saginaw

WITH 3 MAJOR IMPROVEMENTS FOR 1956 !

1 TWICE-AS-EASY PARKING. Revolutionary new valve design cuts maximum manual effort in half. It never exceeds 5 lbs.

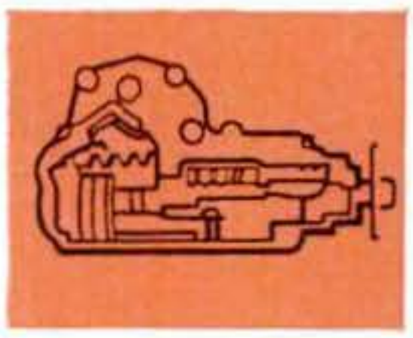


2 GREATER ROAD STABILITY. New system helps hold car "on course"—assures even more secure "road feel" than ever.

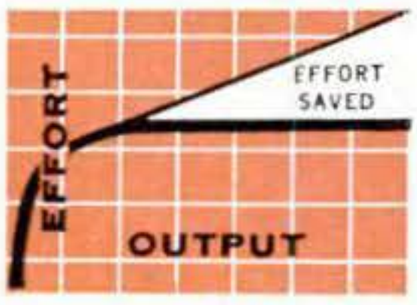


3 RELAXING NEW RESPONSE. Lower-ratio wheel responds more effortlessly—reduces mental and physical fatigue.

NEW "FROM THE GROUND UP"
A completely redesigned, simplified In-Line system with only 49 parts and basic improvements in steering geometry beginning right at the front wheels. Every part has been specifically engineered for *power* steering.



AUTOMATICALLY HELPS HOLD CAR "ON COURSE"—*Precision pre-load* built into ball-nut-and-worm assembly helps keep wheels centered straight ahead.



AUTOMATICALLY LIMITS MANUAL EFFORT WHILE PARKING. New *reaction-limiting valve* cuts in whenever turning resistance reaches predetermined point; increases power assistance to lower manual effort.

MAIL COUPON TODAY FOR FREE BOOKLET!

Saginaw Steering Gear Div
General Motors Corporation
Saginaw, Michigan (Dept 36C)

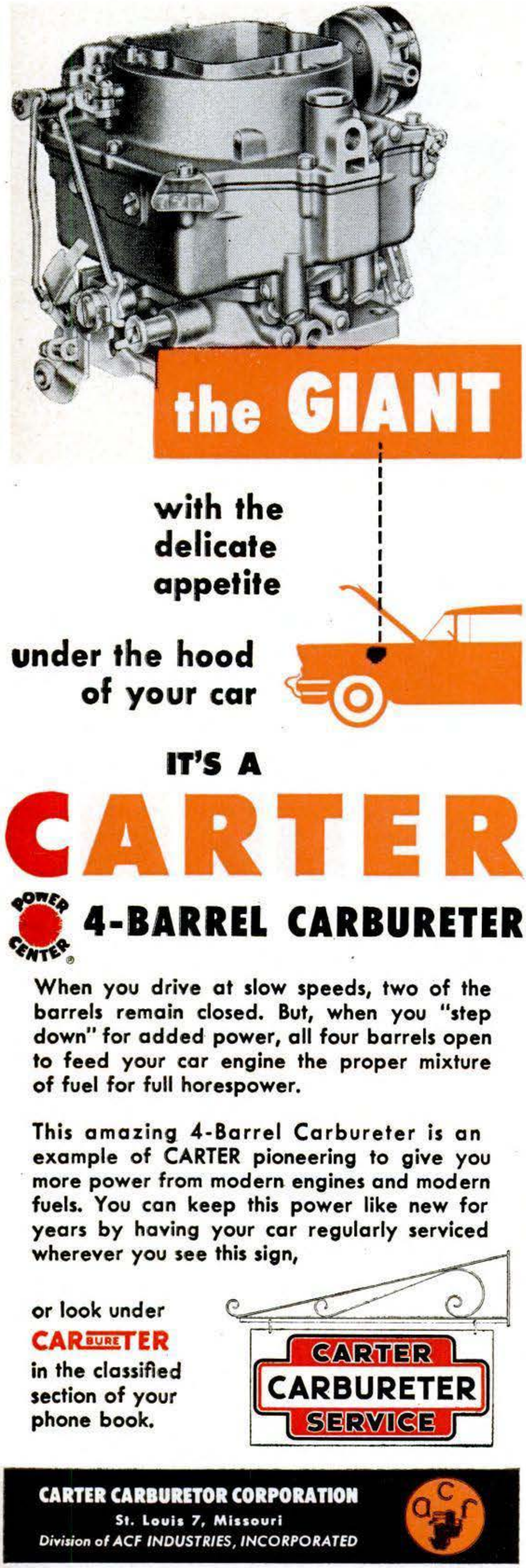
Please send free facts booklet on your NEW Safety Power Steering System

NAME_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

Copyrighted material



America's Favorite Christmas Windows

[Continued from page 240]

There is, however, Silvestri discovered to his sorrow, such a thing as too much motion. His principal character last Christmas was Wee Willie Winkie, who ran around windows, waving his arms, and told children (other animated dolls) that Santa Claus was coming.

Wee Willie, all through the holiday season, kept running his legs off and waving his arms off—a dismaying sight to honored customers (average age seven) of stores from coast to coast. Silvestri's men had their hands full trying to put Wee Willie together again.

To create his figures, Silvestri employs Guido Rabechini, a 62-year-old Italian sculptor whose work includes a frieze at Notre Dame Cathedral in Montreal. Rabechini makes moving statues of plaster, rubber, papier-mâché or excelsior.

Other materials that go into a Silvestri window are legion: spun glass (for angel hair), flock (finely chopped silk and rayon sprayed on as snow), fluorescent satin, ribbons of all widths and colors, kitten cloth (artificial fur), bunny fur (fur but not necessarily rabbit), tree lights (some the size of your little fingernail), manzanita trees, paint, varnish, shellac, cornstarch (in plaster), pipe cleaners, bottle caps, real cookies. He uses Christmas rope by the mile.

All it takes to make a good idea generate steam is a person who can get all worked up over it.

—THE SIDEWALK SUPERINTENDENT

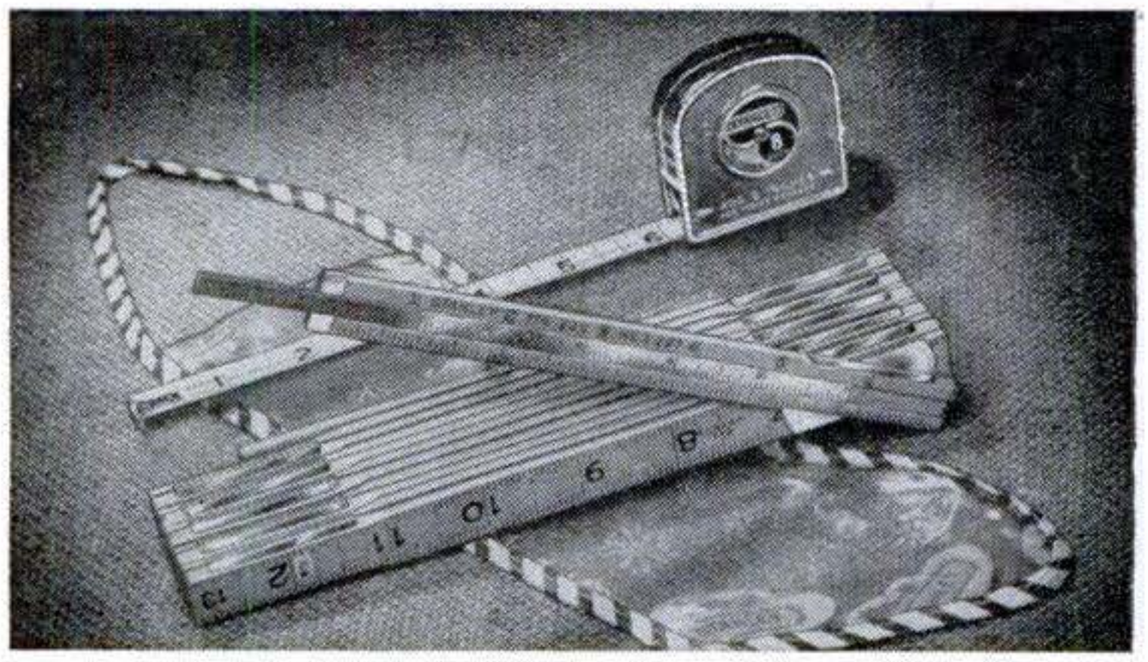
You might expect Christmas at home with his wife, Dorothy, and their three boys, to be on a colossal scale. It is not.

"I feel Christmasy in June," Silvestri confides, "when the year's displays are finished—not in December. By then, I'm a little tired of Christmas."

So on Christmas Eve he trims an ordinary tree in the ordinary way and, he admits, has as much trouble bracing the tree and getting decorations and lights to hang right as you do. END

Copyrighted material

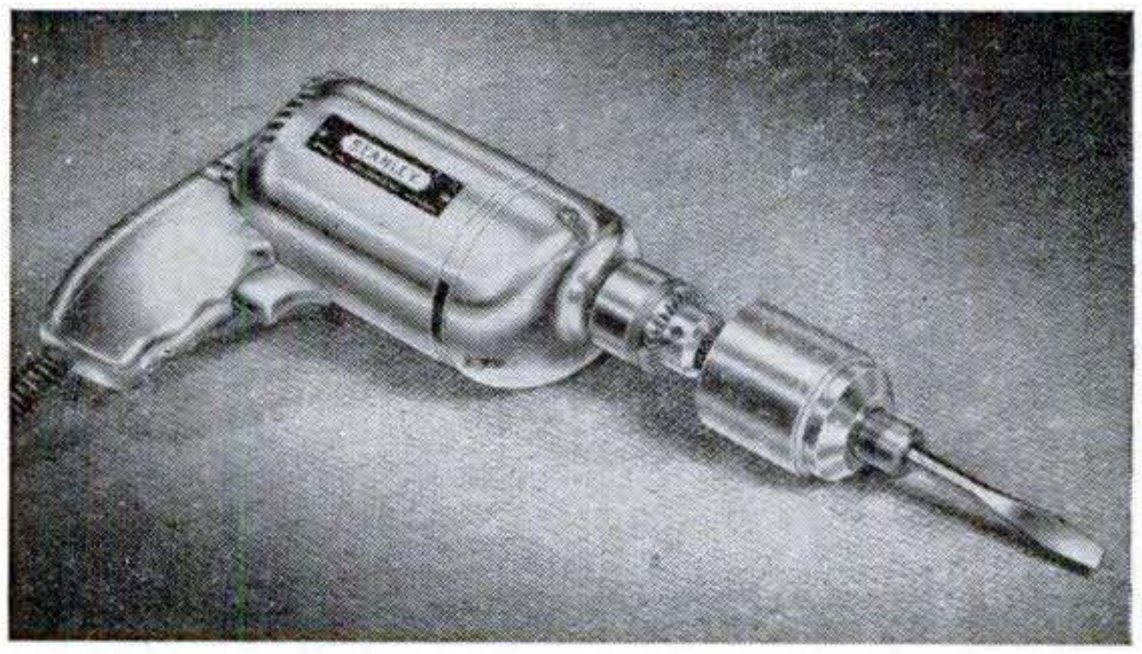
A STANLEY CHRISTMAS means A Happy New Year



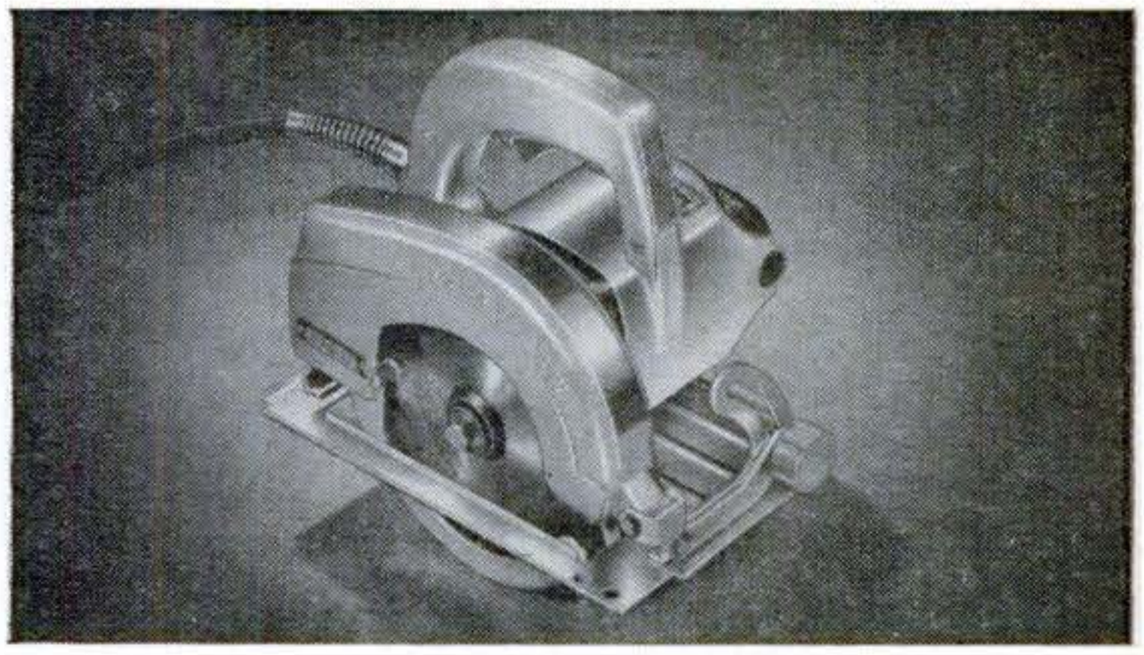
GIVE ACCURACY. It pays to be precise and say Stanley — it's a *good* rule. Here's why: a 6 ft. folding wood rule with extension slide, *No. X227 — $2.49;* and an 8 ft. Pull-Push steel tape rule in free magnifying lens box, *No. 1208W — $1.19.*

GIVE SMACKING SATISFACTION. This Stanley hammer is a handsome and perfectly balanced tool. The selected white hickory handle *absorbs* impact shock . . . keeps it away from your hand. *16 oz. No. N51-1/2 — $3.50.*

Hammers, rules and many other Stanley Tools for Christmas are now at your hardware store with special free Christmas stocking gift wrapping.



GIVE POWER FOR DRILLING AND DRIVING. Here's a work-saving combination. The ¼″ electric drill is still the most popular power tool. *Stanley H41 Electric Drill — $27.95.* And the power screw driver with snap-in bits, *Stanley H180 Screw Driver Attachment — $6.95.*



GIVE POWER FOR SAWING. This portable electric saw makes clean, accurate cutting quick and easy. 6″ blade cuts up to 2 inches at 90 degrees, 1½ inches at 45 degrees. "Motor Saver" feature protects against impact loads. Safe, sure and fast. *Stanley Builders Saw H65 — $67.50.*

STANLEY

The Stanley Works • New Britain, Conn.

TOOLS • ELECTRIC TOOLS
HARDWARE • STEEL • STEEL STRAPPING

DEPARTMENT TE, THE STANLEY WORKS,
63D Elm Street, New Britain, Conn.

Gentlemen: Please send me

- ☐ free Tool Catalog 55
- ☐ free Electric Tool Catalog E15
- ☐ 25¢ Pocket book – "How to Work With Tools and Wood" — I enclose 25¢.

Name _____

Address _____

City _____ *Zone* ____ *State* _____

Copyrighted material

Do-It-Yourself Jewelry Is Booming

[*Continued from page 117*]

engineer to teach jewelry-making. At the end of 18 months, Lloyd gave up contracting and joined Florence on a full-time basis.

Doctors, tool-and-die makers, gardeners, housewives, nurses, farmers, lawyers, children—in the ratio of five men to four women—have come to the Underwoods' Belmont Lapidary Supply for information and instruction.

A carpenter hit pay dirt, too. Bob Smith of Burlingame appeared at the shop one night and simply said, "I want to look for a rock." The Underwoods showed him how and where. He then took courses in lapidary work.

Two weeks after he had finished the courses, Bob brought the Underwoods

The trouble with silver linings is that they're no substitute for cold cash.

—THE SIDEWALK SUPERINTENDENT

a dozen pieces of jewelry that he had created. They were so well made and unusual in design that Lloyd and Florence assured him that he could sell them. He did. Then he started making cuff links and soon left carpentry behind. He now markets 100 to 200 pairs of cuff links a month at 25 men's stores.

It's not expensive. Lloyd points out that a beginner at the hobby can get along nicely with equipment costing between $40 and $50. That would give you a diamond saw, coarse and fine grinding wheels, and sanding and polishing disks, all of four-inch diameter. A seasoned lapidary would want a nine-inch diamond saw, with a vise for slicing two- or three-inch slabs of rock, and eight-inch grinding and polishing disks. Such an outfit costs around $200. For really fine jewelry, he'd add a faceting outfit, an additional $150 to $200.

Raw materials? Well, if you find them for yourself on the beach or along a river or near an abandoned mine, there's only the expense of gasoline and your time, happily spent. END

Copyrighted material

Bostitch T5-8 Tacker with Outward Clinch—It anchors staples inside soft materials entirely from the outside. Staple legs spread to form strong, tight clinch (see diagram). Ask your Bostitch Economy Man for a demonstration.

STAPLES HOLD BETTER AT ONE-TENTH THE COST! Trans World Airlines overlook no detail in assuring the safe, swift arrival of air freight shipments. Shipping bills fastened to cartons with even the best tape sometimes tore loose in damp climates. And taping cost $14 per thousand bills, not counting time taken to apply. A Bostitch Economy Man suggested stapling the bills with a new Bostitch tacker that "spread-eagles" staple legs inside carton walls. TWA tried it, found stapling four times faster than taping and *far superior in holding power.* Cost: $1.40 a thousand. Now all major TWA stations are Bostitch-equipped.

How much can you save by switching to Bostitch stapling?

Your Bostitch Economy Man can tell you. He's one of 350 trained fastening specialists working out of 123 cities in the U. S. and Canada. There are over 800 kinds of Bostitch staplers in his cost-cutting repertoire. Look up "Bostitch" in your telephone directory, or check the coupon at the right.

Fasten it better and faster with

BOSTITCH®
STAPLERS AND STAPLES

BOSTITCH, Inc., 572 Mechanic St., Westerly, R. I.
I'd like to know exactly how stapling can cut costs in our fastening operations. I'm particularly interested in the applications checked below:

HI-SPEED PRODUCTION FASTENING
- ☐ stapling vs. riveting
- ☐ stapling vs. spot welding
- ☐ stapling vs. screws or bolts
- ☐ stapling vs. glue or cement
- ☐ stapling vs. tape
- ☐ stapling vs. tacks or nails
- ☐ stapling vs. solder
- ☐ stapling vs. wire or string

PACKAGING and CARDING
- ☐ sealing bags (cloth, paper or plastic)
- ☐ mounting products on display cards
- ☐ fastening items to individual cards

SHIPPING ROOM ECONOMIES
- ☐ preparing cartons for filling
- ☐ sealing filled cartons
- ☐ lining or padding crates
- ☐ applying shipping bills or tags

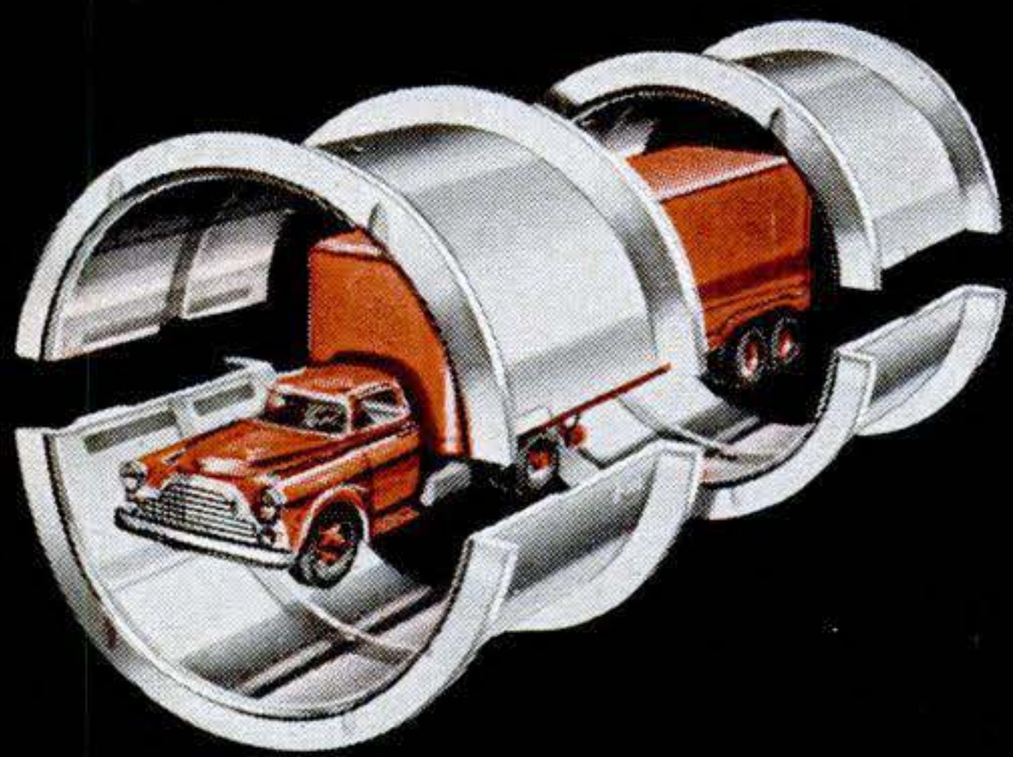
BUILDING APPLICATIONS
- ☐ applying asphalt roofing
- ☐ laying underfelt
- ☐ installing ceiling tile
- ☐ applying insulation
- ☐ installing low-voltage wiring
- ☐ applying shake shingle siding

OFFICE EFFICIENCIES
- ☐ filing
- ☐ routing
- ☐ posting
- ☐ binding folders and reports
- ☐ preparing advertising dummies

*Name*_____ *Position*_____
*Company*_____
*Address*_____
*City*_____ *Zone*_____ *State*_____

Copyrighted material

As many as 14 different metals and alloys are used to produce bearings for the light, medium and heavy-duty engines that power today's trucks. These specially-made bearings assure fine performance under the extremes of load, temperature, speed that are met in truck operation.



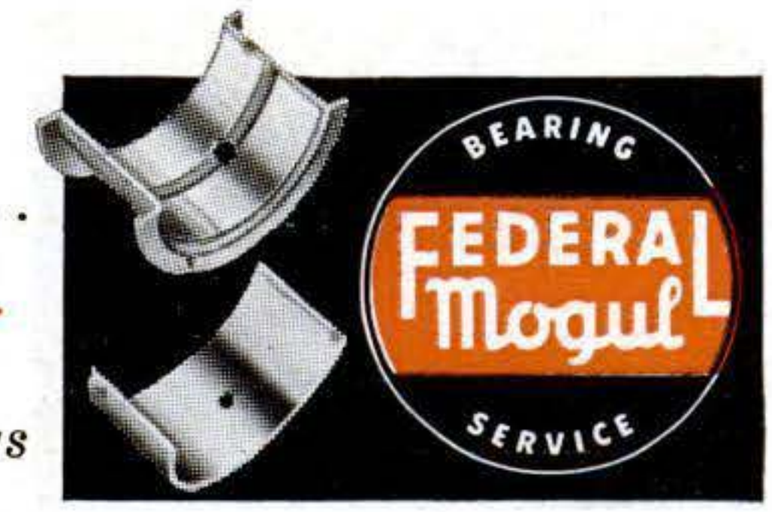
FEDERAL-MOGUL BEARINGS . . .

A Control Factor in Performance

Trucking service is the "professional" test for every automotive part. Engine bearings, for example, have to take the day-and-night pounding of highway hauling and city delivery. Bearings carry the engine load . . . meter the lubricating oil. They must give maximum mileage, to make payloads *really* pay! Modern precision bearings answer these demands with two to five times the mileage of the bearings of only 15 years ago.

Federal-Mogul bearings are preferred by the big truck and bus fleets, for bearing replacement, by 2 to 1. Replace with Federal-Mogul oil-control bearings to renew engine power and pick-up. They are engineered for the job!

for New Power . . .
FEDERAL-MOGUL
Oil-Control Bearings



RESEARCH • DESIGN • METALLURGY
PRECISION MANUFACTURING • SERVICE

You'll Hardly Know Studebaker

[*Continued from page 138*]

has to change plugs on a Golden Hawk fitted with power steering and power brakes will get a workout.

Hot Hawk. Shoehorning the Packard-built mill between the wheel housings may have been a mean job—the engineers beat their foreheads at the recollection—but the result is real lurid. There was only one hand-built car in existence at South Bend last August, and this writer got his hands on it only after promising to stay under 75 and, in proving-ground lingo, "to drive as though you owned it."

The Ultramatic transmission hushes any vulgar rubbery shrieks on take-off. If you *must* attract attention, wind it up to 3,000 and then pull the lever to Drive, a procedure that causes the rear tires to squawl like Shostakovich played backward. With four men, 200 pounds in sandbags and 50 pounds of photo equipment aboard, the G-Hawk easily climbs to 60 true (64 indicated) in 10.3 seconds.

The acceleration is most impressive at highway speeds; the problem after passing someone is to keep from storming down the road at an appalling velocity. The new high-capacity brakes drag the car down quick and straight. These new brakes, also used on the Presidents, have three times the fade resistance of their predecessors.

The future. Studebaker's full '56 line, in which Champions and Commanders count for more than the gilded G-Hawks, is closely integrated this year with its corporate relative (Packard). A full array ranging from the Champion six to the Packard Caribbean is lining up to do battle with the big boys. This marks a definite change. In the past, Studebaker was content to target on the "something-different" market; this year, they propose to fight it out across the board.

A lot of people wish them luck. END

Spaceship Ahoy!

Two space satellites were zipping around the earth in their orbits. One radioed over to the other, "Are you manned or MOUSE?"

Copyrighted material

Gifts from SKIL...for You Mean Christmas all year long for the family!

Famous SKIL Tools help you build for your family. Power-plus and professional features let you handle big jobs in the home. Build a rumpus room! Fix the stairs! Make a cabinet! Finish the basement! SKIL Tools let you give your family *more!* Here are Christmas gifts for you that mean *family fun all year long.*

32-PIECE SKIL DRILL KIT
Model 515 . . . Only $39.95.

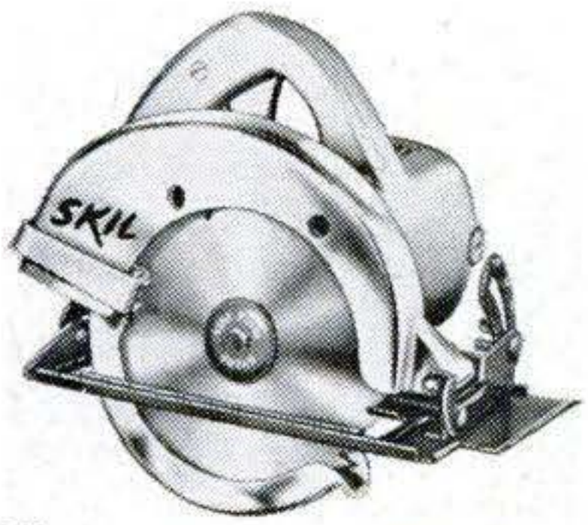
A whole workshop in one handy kit! 32 great tools including a powerful ¼" SKIL Drill with geared chuck. Sand, polish, drill, buff, mix paint . . . all with the same SKIL Tool. You get all this:

Model 549 SKIL Drill with geared chuck . . . Drill Stand . . . Rubber Disc Pad . . . Polishing Bonnet . . . 5 Sanding Discs . . . 2 Arbor Adapters . . . Paint Mixer . . . Grinding Wheel . . . Wire Brush . . . Counter Sink . . . 3 Wood Augers . . . 13 Drill Bits . . . Wall Type Carrying Case.

LEARN ABOUT THE FUN SKIL TOOLS OFFER. SEE THEM AT YOUR HARDWARE, DEPARTMENT OR APPLIANCE STORE.

SKIL
BUILDERS TOOLS

Made Only by SKIL Corporation, formerly SKILSAW, Inc. 5033 Elston Avenue, Chicago 30, Ill. 3601 Dundas Street West, Toronto 9, Ontario. Factory Branches in ALL Leading Cities



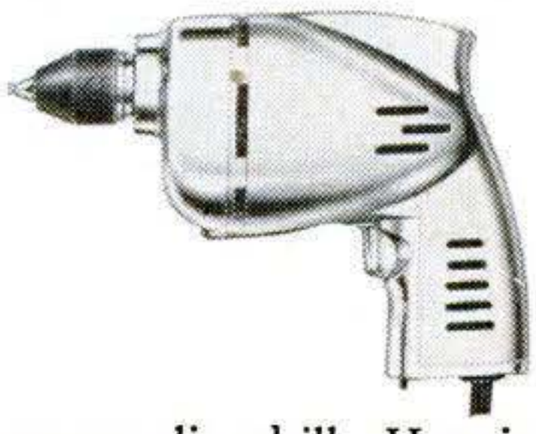
6" SKIL SAW
Model 526 . . .
Only $49.50.

All the exclusive SKIL features and the power of many professional saws. Sawing jobs become simple for you. Make kitchen cabinets, build a fence or finish the basement. Just look at these professional features SKIL offers:

- **6,100 r.p.m. powerful 8 ampere motor**
- **Trigger switch for right or left hand control**
- **Automatic safety guard**
- **Tilts to 45 degrees for bevel cuts**
- **Quickly converts to a bench saw**
- **Extra powerful A.C.-D.C. Universal Motor**
- **Rugged die cast aluminum housing**

Other models as low as $29.95

NEW ¼" SKIL DRILL
Model 535 . . .
Only $19.95.



Lowest price ever for a famous quality drill. Here is the greatest tool investment you could make. Power to drill through ¼" steel or ½" hard wood. Use it for hundreds of jobs, in the home, the garage or the basement. Look at these features:

- **Famous Keyless Chuck**
- **Hardened Steel Gears**
- **Powerful Motor**
- **Trigger-Type Switch**
- **Self-Lubricated Bearings**
- **Pistol-Grip Handle**
- **2500 r.p.m. Speed**
- **Only 3½ Lbs.**

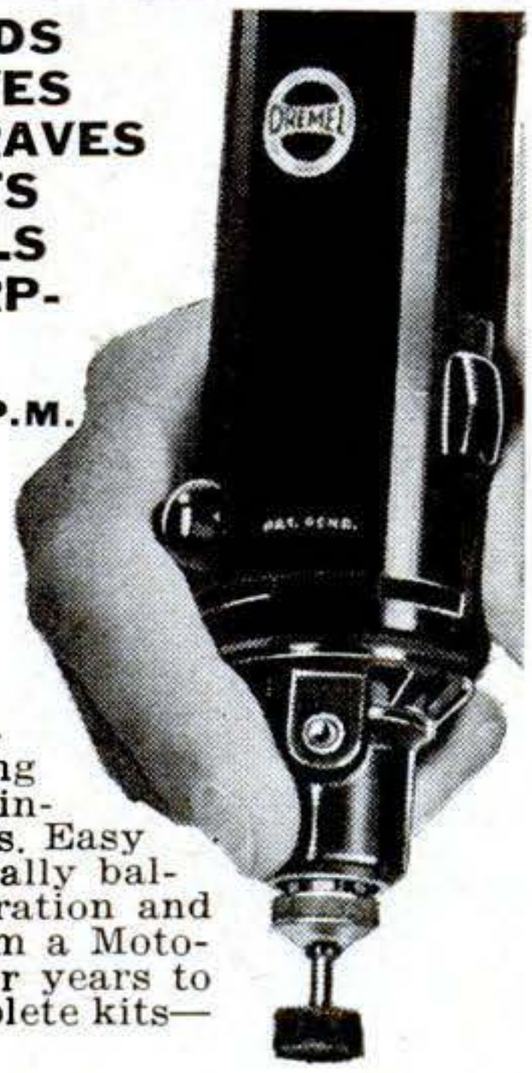
Other models up to ½"

Copyrighted material

Please Him With the TOOL of 1001 uses

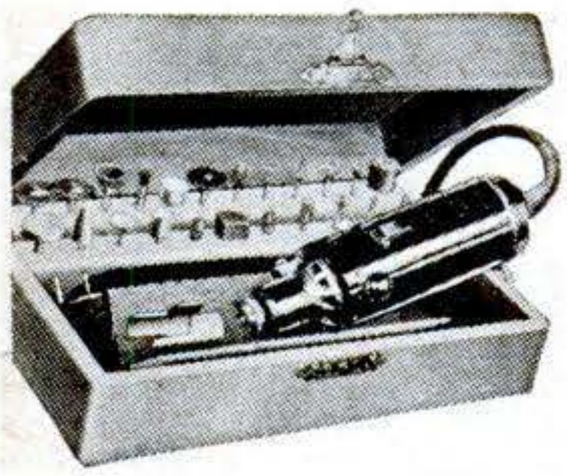
- GRINDS
- CARVES
- ENGRAVES
- ROUTS
- DRILLS
- SHARP-ENS

27,000 R.P.M.



DREMEL Moto-Tool "The Pocket-Size Machine Shop!"

Most powerful . . . most versatile tool of its kind! Works in wood, metal, plastics . . . does 1001 money-saving jobs. Proved in hundreds of industries, thousands of homes. Easy to use as a pencil (dynamically balanced for vibrationless operation and weighs only 13 oz.) Give him a Moto-Tool and he'll thank you for years to come! Choose from two complete kits—or buy Moto-Tool alone.



MOTO-TOOL No. 2
Kit contains 23 accessories including high-speed steel cutters in sturdy steel case, **$25.95**
No. 2 Moto-Tool only, with emery wheel point, **$17.85**

MOTO-TOOL No. 1
Kit contains 34 accessories (steel cutters, grinding wheels, polishers, etc.) in steel case, **$19.50**
No. 1 Moto-Tool only, with emery wheel point, **$10.85**

FAMOUS DREMEL MOTO-SAW A GIFT ENJOYED BY ALL AGES!

Cuts ¾" wood, tile, masonite, etc! Amazing foot-a-minute cutting speed!

A high-speed electric power tool with hundreds of household and workshop uses! So easy to handle, women and children love it—no better way to start a woodworking hobby! Amazing capacity—makes knickknacks, toys, small furniture pieces, other hobby projects. Has rugged reciprocating motor, only 2 moving parts, never needs oiling. Nothing like it at anywhere near its low price! A really thoughtful gift!
SEE YOUR DEALER. If he cannot supply, order direct on 5-day trial, money-back guarantee. Remit in full for postpaid shipment; or send $2 now, pay postman balance plus COD fee.

DREMEL MFG. CO Dept. M-125, Racine, Wis.

Speaker Hurls Voice Four Miles

WORDS spoken into this super loudmouth can be heard clearly up to four miles away. The speaker works like a human voice box, projecting sounds by valving a stream of compressed air. Stanford Research Institute developed it for the Signal Corps for beachhead direction and propaganda warfare.

Plane Folds for Road Trip

YOU could park this folding-wing plane in your garage and just tow it back and forth to the airport. Road-clearance lights are recessed in the wing folds. Ray Stits, Riverside, Calif., custom-builds the 150-m.p.h. two-seater for about $6,000.

Copyrighted material

Now!

Porter-Cable quality in this all new

finishing sander

only $39.50

Here's the great new finishing sander that's got *everyone* talking—with a price tag *anyone* can afford!

It's Porter-Cable's Model 145—and it's a honey! Use it for coarse, medium, and fine finishing on wood, metal, plastics, glass, and many other materials—do hundreds of sanding jobs faster and easier!

Orbital motion lets you sand with, against, or across the grain, with never a gouge or ripple. Husky Universal motor has all the speed and power you'll ever need—lightweight, *balanced* design prevents fatigue.

Best of all, this rugged new Sander is built to Porter-Cable's uncompromising *quality standards* – which means long life, trouble-free service, *value* far beyond its price. See and try it soon!

MODEL 145 — ONLY $39.50 COMPLETE
Precision ball and bronze bearings throughout. Standard 9 x 11 sandpaper size provides 4 abrasive sheets for the 145. Quick-change paper clamps, sturdy die-cast aluminum housing. Weight, 5½ lbs.

Porter-Cable
Quality Electric Tools

PORTER-CABLE MACHINE CO.
515-B N. Salina St., Syracuse 8, N. Y.

Yes, send me a complete catalog sheet on the Model 145 Finishing Sander, and the name of my nearest dealer.

Name_____

Address_____

City_____ Zone____ State_____

In Canada, write to Porter-Cable, Ltd., Box 5019, London, Ontario. Canadian prices slightly higher.

saws • belt sanders • finishing sanders • drills • routers • planes

Copyrighted material

New HASTINGS WEAR REDUCER

Guaranteed to do all 3 or Double-Your-Money-Back!

- Make your engine smoother, quieter!
- Stop hydraulic valve lifter noise!
- Smooth out your automatic transmission!

ADD A PINT TO ANY MOTOR OIL—H-W-R works with any brand or type preferred, including heavy duty and detergent oils.

WORKS IN ANY FULLY AUTOMATIC TRANSMISSION Add a pint to the transmission fluid to stop jar and jerk.

HASTINGS MANUFACTURING CO. • HASTINGS, MICH.
Wear Reducer, Casite, Piston Rings, Oil Filters, Spark Plugs

The New TVs Are Bigger, More Powerful

[Continued from page 122]

shimmering, rolling or tearing picture.

Sensitivity. How sensitive are the new sets? Some manufacturers report that their sets can make a usable picture from a signal measuring only eight microvolts per meter. Others report that a signal measuring 70 microvolts per meter—nine times as great—is required for a usable picture.

But what is a "usable picture?" Experts disagree. So the sensitivity figures given in the chart must not be taken too literally. Many manufacturers will not specify sensitivity for this reason.

Picture quality. Sensitivity gets you a picture. You want more—a sharp, detailed picture. How sharp and how detailed the picture is depends greatly on the intermediate-frequency (IF) amplifier and video-amplifier circuits.

Most '56 TVs have three IF stages and one video-amplifier stage, but more expensive chassis are likely to have four IFs and two video amplifiers. Almost all IFs now operate at about 40 megacycles frequency, which is less likely to be bothered by interference. But the 20-megacycle IFs can be just as interference-free, if properly filtered.

Filters and traps. A strong signal, such as police or ham radios, or an airway beacon, may ride into the IF amplifiers of your set if their frequency is near that of your IF frequency. This will be amplified along with the picture signal and ruin your picture. IF traps and high-pass filters in the antenna input stop this interference before it has a chance to get to the set. FM and IF traps are tuned to block specific bands of frequency, while high-pass filters cut out all frequencies below Channel 2.

One bottleneck that limits picture detail is band width—the frequency range that the IF and video circuits can handle. Band width varies all over the lot in '56 television sets.

The receiver band width should match the band width of the transmitted signal. This is set by the Government at a the-

[Continued on page 252]

Copyrighted material

MODERN LAWN MOWER SHARPENER

COMPARE BEFORE YOU BUY

Write for free booklet 11R

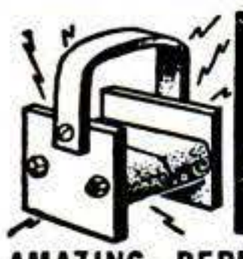
Start your own business—increase your income

Sharpens any mower in ten to twenty minutes. Handles complete assembly of all reel types including 36 in. power mowers. Handle, wheels, roller, and engine are not removed.

Oil remains in engine while sharpening. Bed knife sharpened in same centers — no attachments needed.

$263.00 F.O.B. PASADENA

MODERN MFG. CO.
160 N. FAIR OAKS, PASADENA, CALIF.



MAGNETS 225 lb. PULL

GENUINE ALNICO—NEVER WEAKENS

AMAZING, PERMANENT MAGNETS—WILL NOT WEAKEN! NON-ELECTRIC
Retrieve guns, tackle, tools and other steel items from lake, river, plating tanks, drains or other hard-to-reach spots. Recover drills, taps, etc. from sweepings. Clear alley of harmful tacks, nails. Many other uses. Pays for itself quickly. GUARANTEED. Try any magnet one week. Money refunded if you are not well pleased.

No. S-725 (Weighs 54 oz.) Has pull of 225 lbs. on steel block $15.00
No. S-625 (Weighs 70 oz.) Has pull of 125 lbs. on steel block $ 8.50
No. S-575 (Weighs 18 oz.) Has pull of 75 lbs. on steel block $ 6.00
No. S-500 (Weighs 13 oz.) Has pull of 50 lbs. on steel block $ 4.00
No. S-101 U-Shaped Magnet (Wt. 2¼ oz.) Pull of 6½ lbs. 2 for $ 1.50
No. S-30 Hobbyist assortment of five small magnets.....$ 1.00
No. S-48 Powerful Hot Pad Magnets. 8 for $1.00....30 for $ 3.00

Send Money Order or check. We pay postage. No C.O.D.'s.

MIAMI MAGNET COMPANY, 3240 N.W. 27th Ave., Miami 42, Fla.

WELD BRAZE SOLDER CUT

4 WAY WELDER

ONLY $14.75 f.o.b. factory

Acclaimed by thousands of Homeowners, Mechanics and Hobbyists as the welder of 1001 uses. Easily operated from properly wired 110 volt AC or DC line. **The ideal gift with a life-long use . . .** Order today on 10 day money back guarantee.

Complete with Twin Carbon Arc Torch and accessories . . . to handle all metal-craft work.

FOUR-WAY WELDER CO., Dept. F3-N
1810 S. Federal St. • Chicago 16, Ill.

A PRECISION LEVELING INSTRUMENT for only $12.95

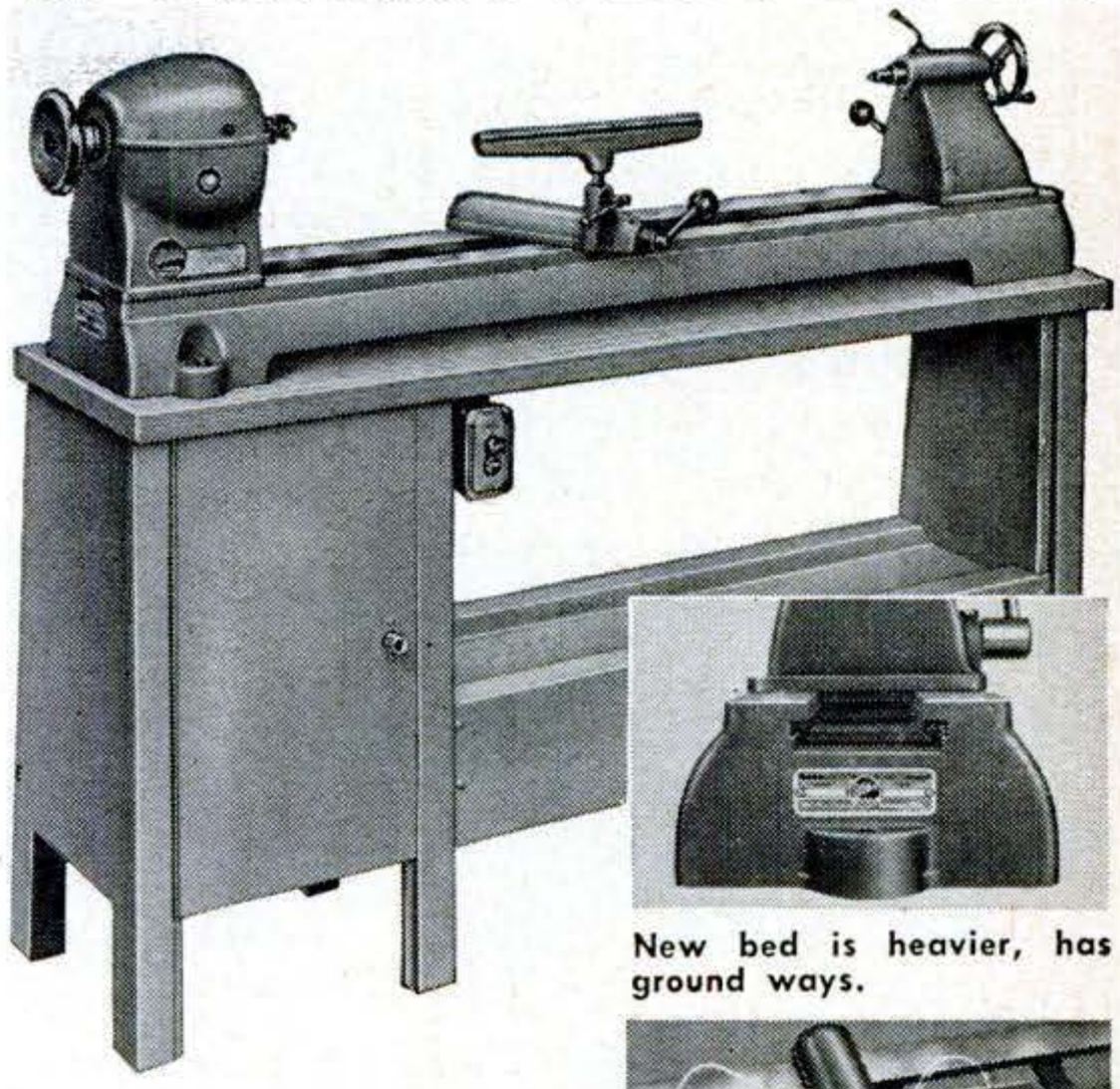
With the New LEVELALL one man can do the work of two men and a transit, quickly, easily, accurately. All alone you can speedily level points for footings, forms, piping, batter boards, sills, lintels, floors, ceilings, roads, driveways, lawns — any type of construction work. Send for Free booklet or, better yet, order a DeLuxe Levelall today.

*Name*_____
*Street*_____
*City*_____ *Zone*____ *State*_____

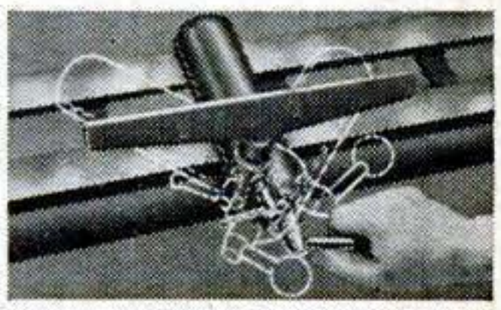
☐ Mail 75' DeLuxe Levelall @ $12.95 ☐ Regular 50' model @ $9.95 ☐ Ship postpaid full price enclosed
☐ Ship C.O.D. Money-back satisfaction guaranteed.

LEVELALL 81-L Webster Street, Rockland, Mass.

FINEST WOOD LATHE in *Atlas* HISTORY



New bed is heavier, has ground ways.



One movement of lever loosens tool support for instant positioning, or anchors it to bed.

Headstock spindle is turned from a solid bar of tough, fine-grained steel, accurately ground. Sealed-for-life ball bearings take all radial and thrust loads and are preloaded at factory to eliminate spindle play. Top is hinged to make belt changing easy.

NEW FUNCTIONAL CABINET STAND

The new ATLAS 12" is a heavy-duty lathe built for professional workmanship and efficiency in the *complete range* of turning operations . . . inboard and outboard . . . light or heavy.

Has new massive bed with *ground* ways. 60-hole indexing mechanism. 4 speeds. Lever-controlled bed locks. Sealed-for-life ball bearings.

And what a stand . . . a completely new cabinet design . . . a massive foundation for accurate work, with $\frac{3}{16}$" steel plate construction, thick wood top, enclosed V-belt drive. Your shop isn't complete without this fine lathe. Write for literature.

20 PRACTICAL WOODWORKING PLANS

Distinctive projects for everyone — letter rack, knife holder, bar stool, cocktail table, table lamp, etc. 32 pages. Size 8½" x 11". Price 50c (65c outside U.S.A.)

ATLAS PRESS CO.
12-25 N. Pitcher St., Kalamazoo, Mich.

Please send catalog showing wood lathe. Enclosed is $_____ for 20-Plan Book.

Name_____
Address_____
City_____ State_____

Copyrighted material

[*Continued from page 250*]

oretical maximum of 4.0 megacycles for video information, but is never actually that high. If the receiver band width is far below the theoretical figure, however, it will probably block some detail that is in the transmitted picture.

Transformer or no? The lack of a transformer will not matter to viewers who leave all servicing to a technician.

But it may matter to those who have become adept at putting their own sets in order by the try-a-new-tube technique. Most transformerless sets have their tube filaments wired in series, like the older Christmas-tree lights. If one filament burns out, the whole set goes dead. There will be nothing on the screen to give a clue to the faulty tube, and the old stunt of feeling tubes to locate a cold one will not work either, since they will all be cold.

Some basically transformerless sets get around this by using a filament transformer with the tube filaments wired in parallel: If one tube fails, you can find it because the others remain lit.

If you operate any transformerless set with the back removed for repair work, you risk a more serious electric shock than you would by working on a transformer-equipped one. The chassis and other metal parts are hot, connected to one side of the power line.

Sound. The day when you had to be satisfied with an audio system that sounded like a $9.95 radio is past. Cheap table models still have small speakers, but even they are bigger than they used to be. Consoles frequently have two or three. And nearly every maker has TV-radio-phonograph combinations with high-quality sound systems. Magnavox, for example, offers as an option with any TV chassis a separate record player-radio that uses a 10-watt push-pull audio amplifier. All but the smallest, cheapest sets have some provision for receiving the new UHF stations. END

IT SMELLS GRAND

HERE'S THE SEASON'S FRAGRANCE HIT!

IT PACKS RIGHT

THERE'S LOTS OF FUN IN LOADING IT!

IT SMOKES SWEET

AND MAN-WHAT PLEASURE WHEN IT'S LIT!

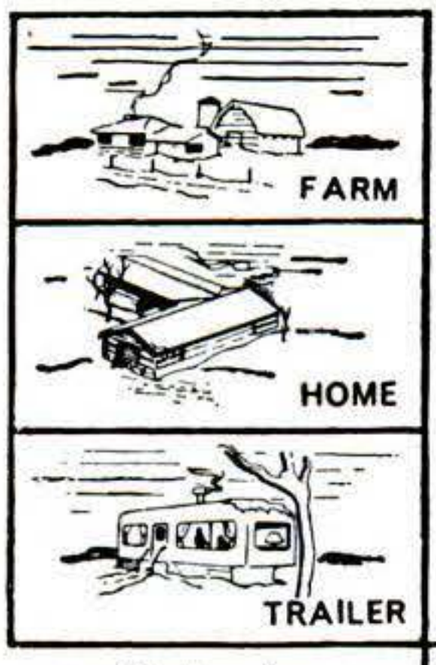
IT CAN'T BITE!

SIR WALTER RALEIGH'S BLEND OF CHOICE KENTUCKY BURLEYS IS EXTRA-AGED TO GUARD AGAINST TONGUE BITE. XMAS WRAPPED... IT MAKES A PERFECT GIFT.

Copyrighted material

STOP FROZEN PIPES!

ELECTRIC HEATING TAPE



Self Adhesive! Just Wrap It On and Plug It In—It Sticks!

Easily, quickly applied. Protects water pipes, oil lines, pumps. Use thermostat for automatic operation.

Low Cost . . . Do-It-Yourself
Prevent Costly Repair Bills

Trouble free, lasts for years. Protect to 50° below zero with WRAP-ON fiberglass insulation. No tools needed.

send today for your **FREE** WRAP-ON instructions

At hardware, electric, farm, poultry and trailer dealers.

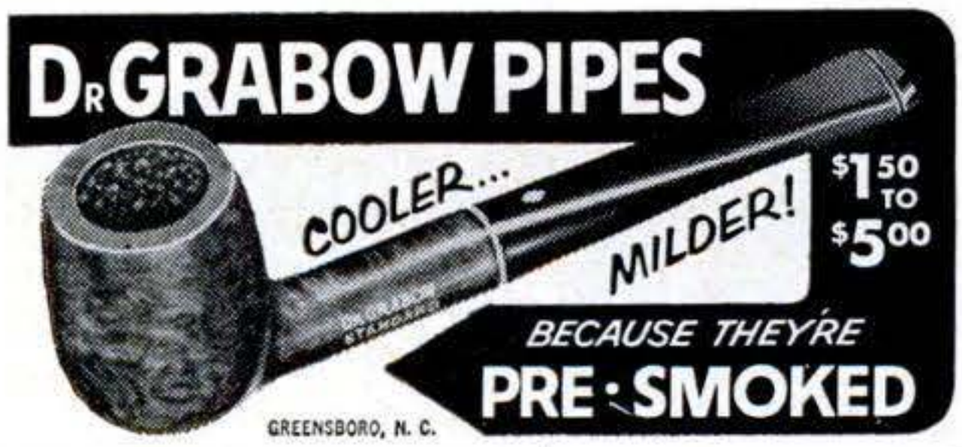
WRAP-ON Co., 340 W. Huron St. Dept. 709, Chicago 10, Ill.

Earn Big Money! DRY CLEAN RUGS

New Easy Way! Dry clean rugs on location in homes, stores—fast and easy—machine does hard work for you! Amazing ALM-13 machine with Float-Action Brush whirls cleaning material into rug fibers—gets out grime, dirt like magic! Use rug at once. Also, use same machine with no-tool attachments to clean, wax, polish any floor—*make extra profits!* Write for details.

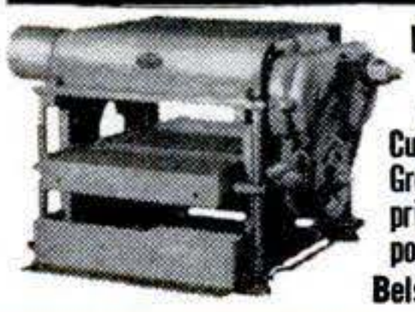
AMERICAN Floor Surfacing Machine Co.
532 So. St. Clair St., Toledo 3, Ohio

DR GRABOW PIPES



DO MORE PLANING JOBS WITH LOW COST BELSAW

LOW DOWN PAYMENT EASY TERMS



Exclusive MONEY-MAKING Features: • Full 12¼" x 6" capacity • Power feeds at 24' a minute • Provides for Grinding Knives in the Cutterhead • Attachments for Jointing, Rabbeting, Tongue, Groove, Matching. Convert low cost rough lumber into high priced cabinet finished stock . . . Easy to make flooring and popular patterns. Send today for free literature and prices.

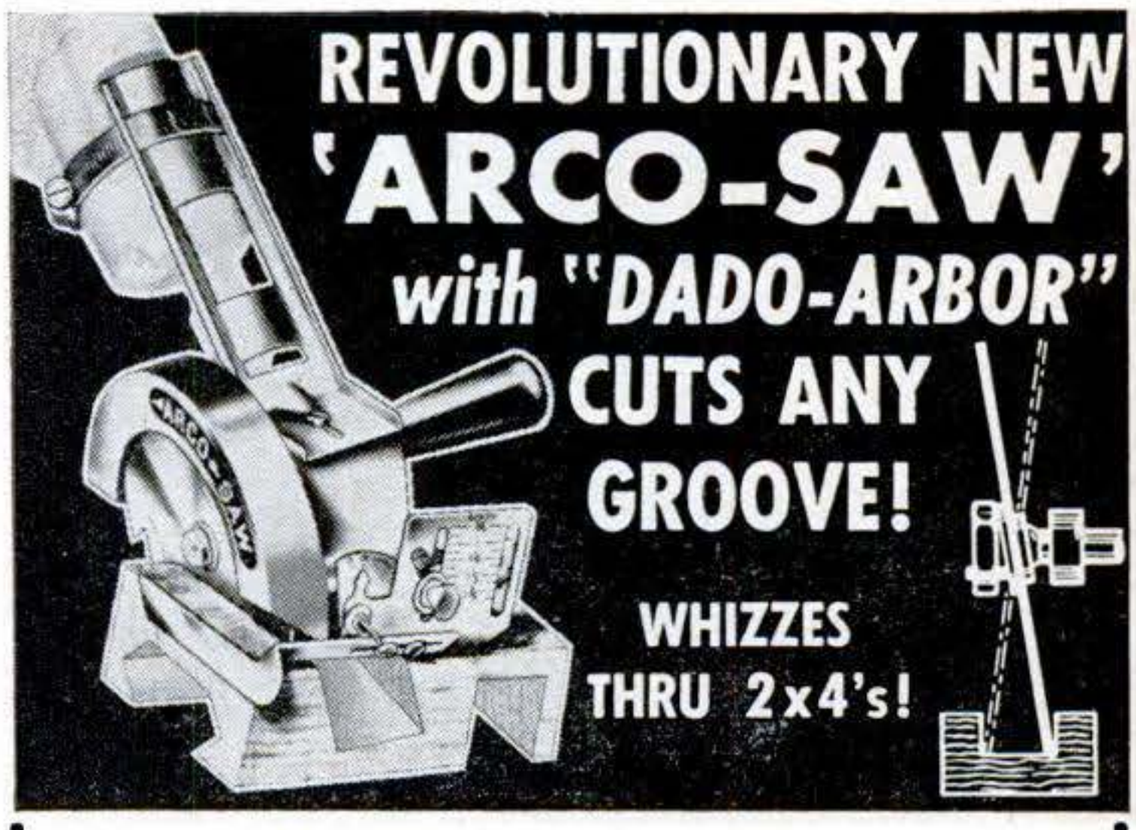
Belsaw Mach. Co, 2066 Field Bldg., Kansas City 11, Mo.

Buy U. S. Defense Bonds

The fine car at half the fine-car price

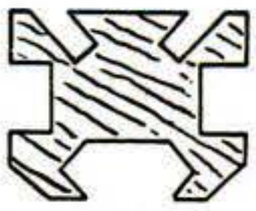
FORD!

REVOLUTIONARY NEW 'ARCO-SAW' with "DADO-ARBOR" CUTS ANY GROOVE!



Not even a $100 Portable Saw has a dado cutter! "Arco-Saw" (guaranteed to fit any ¼" electric drill) with sensational new "Dado-Arbor" adjusts easily to cut any size groove up to ½" wide x 1" deep in **ONE CUT!** Graduated **Depth-Bevel-Rip Gages** adjust for depth of cut up to 1¾", angle cuts to 45°. Amazing swivel action of "Dado-Arbor" (see sketch above) cuts large grooves cleanly and accurately with little power. "Dado-Arbor" is easily removed to use the saw for straight ripping, crosscutting or angle cuts. Right angle steel gear drive and safety-yoke permit ONE HAND operation. Includes quick-cutting 5" **Safecut Blade.**

BLADES—5" Rip, X-cut or Combination **$1.75**

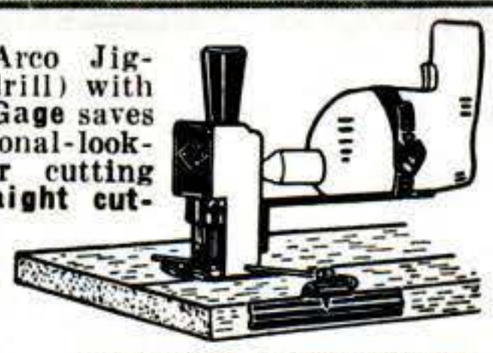


CUT GROOVES LIKE THESE

ONLY $12.95

"ARCO JIG-SAW" WITH EXCLUSIVE NEW CIRCLE-CUTTER & RIP GAGE!

Another "ARCO" FIRST! "Arco Jig-Saw" (guaranteed to fit any ¼" drill) with **Adjustable Circle-Cutter & Rip Gage** saves hours of work—assures professional-looking results everytime—whether **cutting circles, curved patterns, or straight cutting.** Cuts perfect circles any size up to 20" diameter; rips accurate widths any size up to 10" wide. Has same capacity and cutting speed as $55 jig saws. Does work of **Jig, Keyhole, Coping, Rip, Crosscut, Band & Hacksaw!** Built-in "Air-Jet" blows away sawdust. Cuts intricate patterns—however large—in plywood, plastics, metals—even cuts **2x4's!** Starts inside holes. Includes blade. Converts to **Table Model** with **either**



RIPPING WITH GAGE

$8.95 No. 500 without gages.
$9.95 No. 550 with gages.

No. 401 "ARCO STAND" Sturdy Casting & Clamp . . . $[illegible]
or **No. 410 "ARCO DRILL-SHOP"** including "Arco Stand," clamp, ¼" drill arbor, 4" buffing wheel, 3" wire brush, 3" grindstone & rouge. **Special low price** **$4.50**
6 Extra Assorted **Blades** for wood, plastics, metals **$1.95**

SOLD AT BETTER HDWE. STORES EVERYWHERE. If not available, order direct and try these amazing tools on our **UNCONDITIONAL 10-DAY MONEY BACK GUARANTEE.** Send check or M.O. (ppd.) C.O.D.'s—plus post.

ARROW METAL PRODUCTS CO.
Dept. PS-12, 140 WEST BROADWAY, NEW YORK 13, N.Y.

Copyrighted material

Make MORE Money with this Low Cost "Husky Boy"

200 ampere air-cooled engine driven

Arc Welder!

★ Welds Anywhere!

In or out of the shop, the "Husky Boy" can earn bigger profits for you. And you save more on the purchase cost. Lighter weight makes it ideal for using on small service truck for quick emergency calls.

For use in the shop, wheels and handles are available at a slight additional cost.

200 Ampere Bantam Champ

Full 200 amps. (not skimped)
Specially built for smaller shops requiring lighter weight and lower investment, the "Bantam Champ" gives full 200 amp.

You can "Build Your Own"
You can save even more by "Building Your Own" with this Hobart generator. Just connect the "Build-Your-Own" to your own used auto engine . . . it's perfect for small operations which do not justify a complete, factory built outfit.

Generator for "Building Your Own"

AC Welder with AC Power for tools
The AC-AC Welder and Power Unit lets you do numerous repair jobs where no power is available . . . also furnishes emergency power for electric lights and power tools. 200 or 300 amp. size plus 5KW AC power.

Transformer Type AC Welder

AC Transformer type
For improved AC welding performance. Operates on single phase 220 power lines.

Welding Lessons $1
Complete operator's training course. 200 pages fully illustrated.

HOBART WELDING SCHOOL
Be your own boss! Learn profitable arc welding at the non-profit Hobart Trade School. Skilled instructors give you on-the-job training. Complete or partial courses with latest equipment. G. I. bill approved. Write for free booklet.

FREE Welder's Vest Pocket Guide
USE THE COUPON

HOBART BROS. CO., BOX P-125, TROY, OHIO
"One of the world's largest builders of Arc Welders." **Phone 21223**

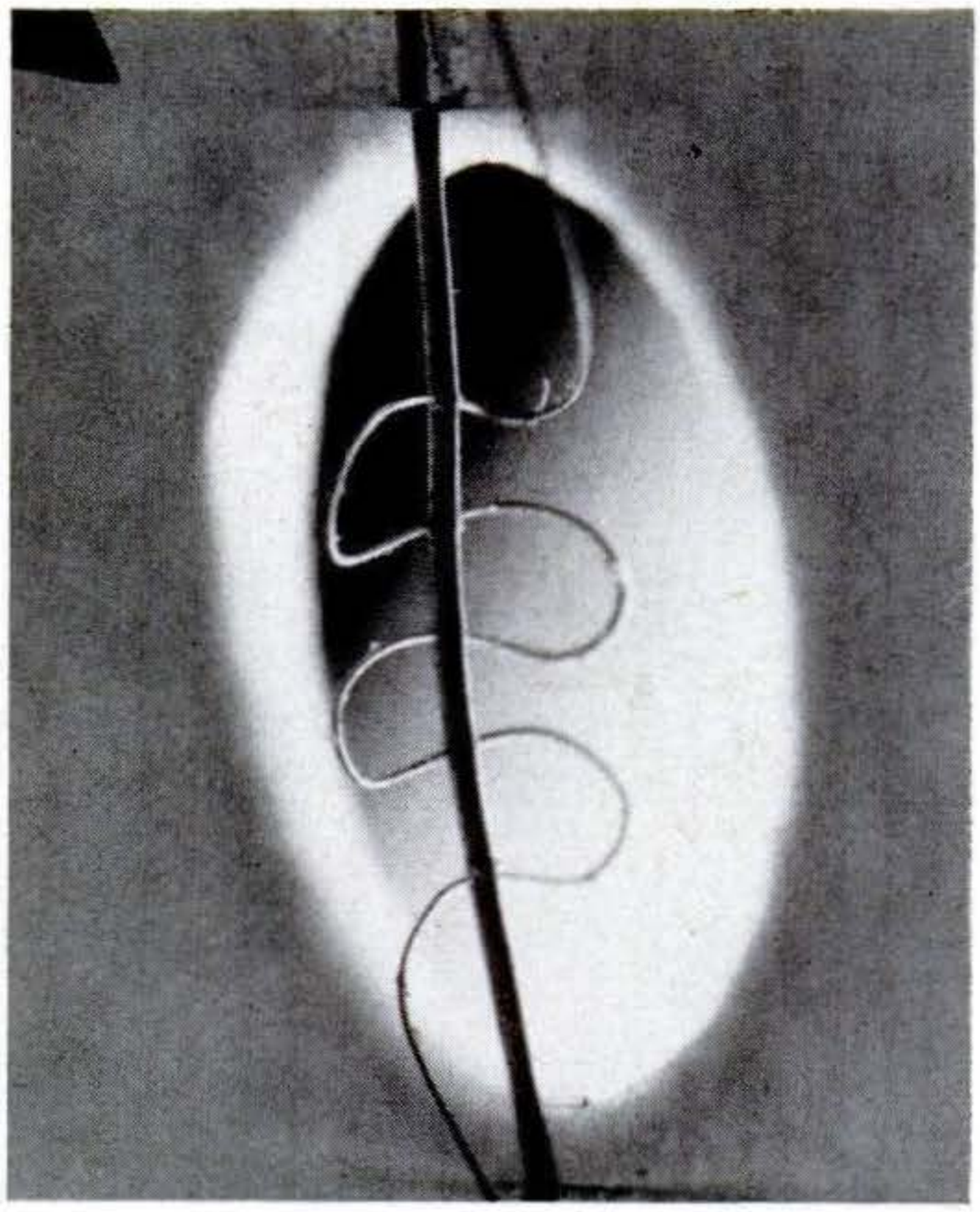
☐ Welders' Vest Pocket Guide

Hobart Brothers Co., Box P-125, Troy, Ohio
Please send additional data on items checked:
☐ "Husky Boy" ☐ "Bantam Champ"
☐ Transformer Type AC ☐ "Build Your Own"
☐ Hobart Welding School ☐ Welding Lessons, $1.00

NAME

ADDRESS

CITY STATE



Tool Drills Microscopic Holes

THAT thick strand above is a human hair. Through it a microscopic strand of .001-inch wire has been threaded. A one-mil drill too small to be seen by the naked eye made the holes. GE instrument makers performed the stunt to show their facilities for drilling minuscule apertures.

"Hot" Food on Way to Bugs

THESE concrete drums of hot stuff are leaving Britain for Africa to help cut down disease in cacao trees. Mealybugs, pests that infect the trees, will be fed the radioactive material and released so they can be traced and their feeding habits studied.

Copyrighted material

A new material for home craftsmen...NOVOPLY!

Versatile extending coffee table, #452 (50c)

Record storage cabinet, #436 (50c)

Sewing table-desk, #543 (50c)

Handsome, textured NOVOPLY gives "fine furniture" look, is low in cost, works easily with all tools

Now build your own beautiful furniture with Novoply, the new do-it-yourself material that costs about the same as ordinary fir plywood.

Easy-to-work Novoply is smooth and flat, good both sides, has no grain direction to worry about. Its warp-free qualities make it perfect for sliding doors, drawers, cabinets, table tops. Novoply looks well natural or stained; comes in many sizes, in ⅜" and ¾" thicknesses, in pine and in California redwood.

See Novoply soon at your lumber dealer's—and while you're there ask about Weldwood hardwood panels in birch, walnut, mahogany, oak and other fine woods—for wall paneling and furniture.

Use Novoply to make 3 projects shown! Send coupon today for famous Easi-Bild* Patterns and get Easi-Bild's big catalog—shows over 200 handsome pieces you can make. Patterns give step-by-step illustrated instructions—take the guesswork out of build-it-yourself.

*T. M. REG. EASI-BILD PATTERN COMPANY

NOVOPLY®
by Weldwood®
a product of
UNITED STATES PLYWOOD CORPORATION
Weldwood—The Best Known Name in Plywood

UNITED STATES PLYWOOD CORP.
Pattern Dept., P.O. Box 215, Pleasantville, N. Y.

By return mail please send me the following patterns. I enclose $....
#452, table.....50c ( ) #543, desk.....50c ( )
#436, cabinet.....50c ( )
Also send Easi-Bild Pattern catalog.....35c ( ) PS 12-5

NAME.....

ADDRESS.....

CITY.....STATE.....

BUILD YOUR OWN POWER TOOLS- WITH GIL-BILT PARTS KITS

PLANS only $1.00 EACH POSTPAID

Exclusive GIL-BILT Build-It-Yourself Features

- No machining—built easily with hand tools only
- No blueprint reading — step-by-step pictorial plans, full scale patterns, actual photographs.
- Sturdy wood, aluminum and steel construction
- Capacity and performance of commercial saws selling from $60 to $250.
- Proved performance. Nationally advertised and sold for 8 years. Satisfied customers around the world.

GIL-BILT 10-in. TILT/ARBOR SAW

- 27x28 in. table, 13½ in. capacity in front of blade
- 10 in. blade cuts 3¼ in. deep, tilts full 45 degrees
- Floor model 34" high, table always stays level
- New Departure ball bearing arbor, ¾" precision shaft turned down for ⅝" bore blades, alum. housing, shipped ready to run.
- Jackscrew and 4½ in dia. handwheel lowers and raises blade.
- Cast aluminum miter gauge and self-aligning rip fence guide

GIL-BILT Metal Parts Kit includes Plans, ball bearing arbor, miter gauge and bar, rip fence guide, dado insert, lock knobs, jackscrew mechanism and handwheel, and all other metal parts (less blade) $22.95
Same Kit with 10" Combination Blade $25.90
Same Kit with 8" Combination Blade $24.90

GIL-BILT 12-INCH BAND SAW

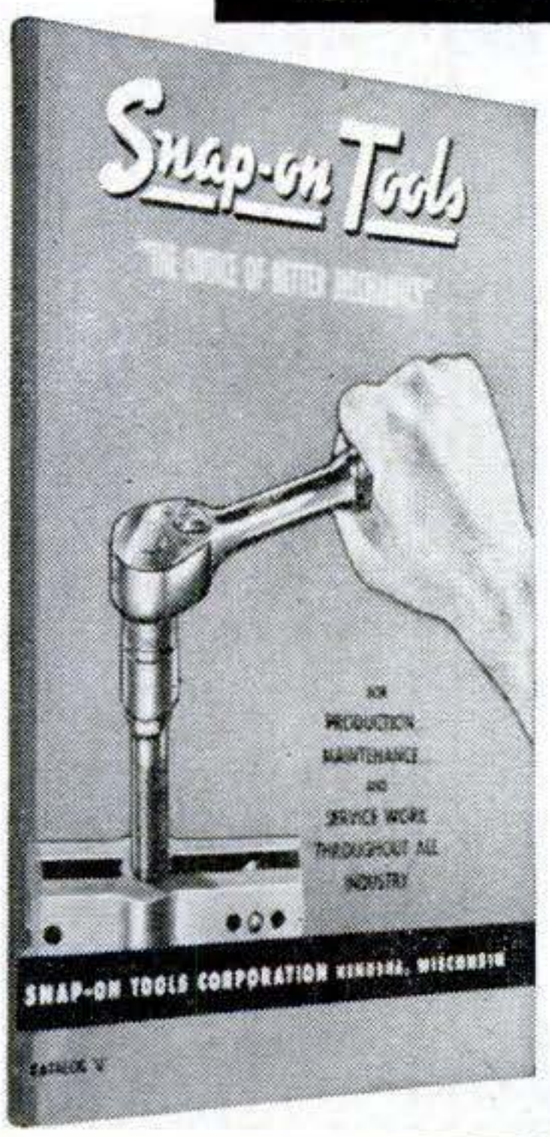
- Cuts to center of 24 inch circle
- Handles stock up to 6 inches thick
- 18x18 inch table tilts 45 degrees
- Lower wheel and drive pulley runs on sealed New Departure Ball Bearings: Upper wheel runs on two ⅝" bore Oilite Bronze bearings.
- Upper wheel tension and tilt mechanism of cast aluminum, completely assembled
- Upper and lower blade guides. Each has ball thrust bearing, self-lub bronze jaws
- Rigid cast aluminum wheels fully machined ready-to-install. Heavy rubber tires
- Uses standard 78 inch blades up to ⅜ in. wide
- Fully enclosed mechanism for utmost safety

GIL-BILT Metal Parts Kit includes Plans, rubber tires, aluminum wheels, ¼ in. blade, ball bearing spindle, tilt mechanism, blade guides, table tilt segments, and all other metal parts.....$23.95
Return Kits in 10 days for refund if not satisfied.
For shipments up to 600 miles, add 5%; over 600 add 10%
Amount in excess of actual postage will be refunded.
Order Kit now, or order Plans at $1.00 each and Kit later less cost of plans. Write for **FREE** Catalog.

ALSO AVAILABLE Plans & Parts Kits for 18-in. Band Saw, Belt Sander, Spindle Shaper, 8-in. Tilt-Table Saw

GILLIOM POWER TOOLS Dept. 70-M Lambert Field St. Louis 21, Missouri

send for FREE CATALOG



America's Foremost
money-making
MECHANICS' TOOLS

It's easy to own the same "pay-off" tools used and endorsed by America's top-earning mechanics throughout the automotive, aviation and industrial fields! Snap-on tools help you handle every repair job faster, easier, better. And they LAST . . . pay for themselves over and over again! Start building your own tool set now with basic Snap-on units—add others any time. Genuine Snap-on tools are never sold in stores—direct to users only. Mail coupon for free catalog.

Snap-on Tools
THE CHOICE OF BETTER MECHANICS

Snap-on Tools Corporation
8060-L 28th Ave., Kenosha, Wis.
Send me free catalog. Occupation_____
Name_____
Address_____
City_____ Zone_____ State_____

Copyrighted material

MAKE A DEPENDABLE RED SEAL

AU Series Horizontal Shaft

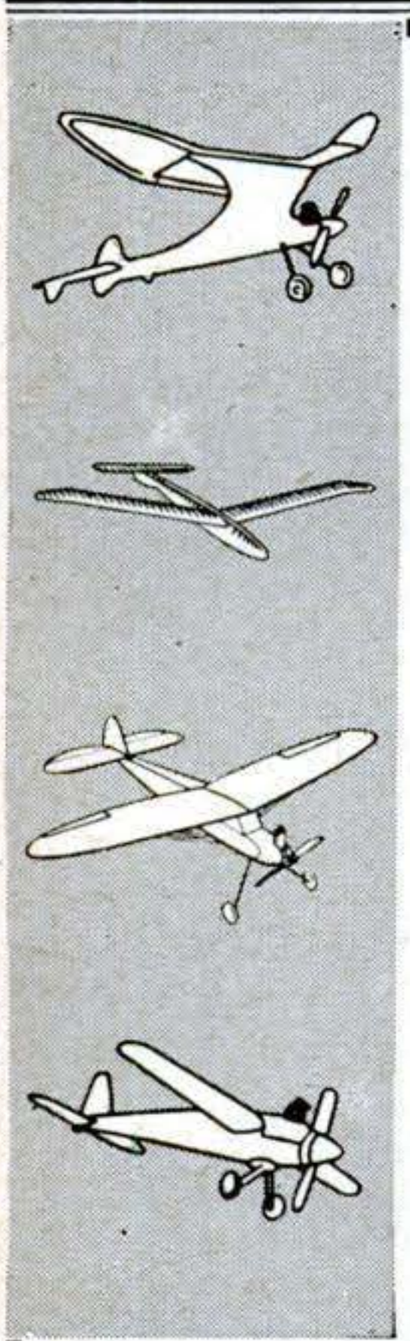
AD Series Vertical Shaft

the HEART OF YOUR MACHINE

Finest power for racers, scooters, lawnmowers, garden tractors—any job within their capacity—is one of today's Red Seal heavy-duty air-cooled models. They're built to get up and go, and backed by engine experience dating from 1902. Greater piston displacement gives power in excess of rating, plus low-speed lugging ability that eliminates stalls. Exclusive Contex ignition system speeds and simplifies adjustment, doubles life of points and plug. Optional low oil level ignition cutoff ends hazards of running dry. NOW AVAILABLE with built-in flywheel generator for charging batteries or lighting lights. For name of Red Seal dealer nearest you, write TODAY.

CONTINENTAL MOTORS · Powerful as the Nation · AMERICA'S STANDARD ®

Continental Motors Corporation
INDUSTRIAL AIR-COOLED ENGINE DIVISION
12800 KERCHEVAL AVE., DETROIT 15, MICH.



Whatever your hobby

Model building, whittling, Indiancrafts, leather, plastics or any other creative handicraft

x-acto knives, tools & sets

designed by craftsmen and precision-made for fine craftsmanship

will help you do a better job

and get more fun and satisfaction from *your* hobby.

Build Model Planes?

Send 10¢ for 32 page book. Full size plans, instructions for 4 models, articles, helpful hints. X-acto 28 page catalog—25¢

x-acto®
KNIVES • TOOLS
HANDICRAFT KITS

No. 86 X-ACTO
HOBBY CHEST—$12.00

X-ACTO, INC., 48-47 Van Dam St., Long Island City 1, N. Y.

Phantom Guides Elevator Riders

A LOUDSPEAKER in a Westinghouse self-service elevator reminds passengers to release doors, press floor buttons and step to the rear. A magnetic tape does the job, even calling off merchandise on each floor in department stores. Phantom voice is an attempt to humanize automatic elevators.

Emblem Is Sealed Inside Lamp

A COATING of fluorescent powder makes a trademark replica glow inside this lamp bulb. Aerolux Light Corp., 653 11th Ave., NYC 36, also makes the two-watt bulbs with flower bouquets, nursery-tale animals and fraternal emblems sealed inside them.

Copyrighted material

SHOP by MAIL and Save at GROBAN'S

SURPLUS & NEW MANUFACTURE EQUIPMENT

-FOR HOME, FARM & FACTORY-

All items unconditionally guaranteed!

SAVE $30.30 ON THIS PESCO

HYDRAULIC CONTROL VALVE

ITEM #371V

FOR SAFE POSITIVE CONTROL OF HYDRAULIC CYLINDERS AND MOTORS — • BUILT-IN RELIEF VALVE—factory set at 1200 P.S.I. • FOUR-WAY VALVE—to operate one double acting cylinder • OPEN CENTER—with valve in neutral, cylinder is locked in position and pump is unloaded. • SPRING RETURN TO NEUTRAL • FULLY BALANCED PLUNGER • EASILY STACKED INTO 2, 3, or 4 valve combinations for multiple cylinder operation. • 8 gal. per min. capacity, at 1500 P.S.I.—3/8" pipe ports • CONNECT PUSH RODS TO HANDLE FOR REMOTE CONTROL • EASY MOUNTING. • LIST PRICE—$46.80. • YOU SAVE $30.30. • DIMENSIONS—9"x4 1/4"x2 1/4"—Ship. Wt.—8 lbs. F.O.B. Chicago . **$16.50**

PESCO GEAR TYPE

HYDRAULIC PUMP

Compact — Powerful — Reliable

ITEM #160—Especially designed for belt drive from fan belt, power take-off, drive pulley, electric motor or small gas engine. Equally suitable for direct coupling. Pedestal type mounting with two bolt holes for 3/8" hold-down bolts. Standard 1/2" pipe thread inlet and outlet ports. Delivers 4.5 GPM at 1000 PSI at 2800 RPM with 4 H.P. Hardened steel gears turn in dense oilite bronze bearings. Rotation—clockwise facing shaft. Guaranteed trouble-free service. Ship. wt. 6 lbs. F.O.B. Chicago **22.50**

DOUBLE ACTION

HYDRAULIC CYLINDER

ITEM #31C—3 1/2" bore, 11" stroke. Alloy steel cylinder wall. Micro-Honed and all steel 1 1/8" diameter piston rod. 19 1/2" overall length closed. Clevis mounting at base and shaft. Will lift 9625 lbs. with 1000 PSI Pump Pressure. Uses 3/8" tubing fittings. (Fittings to pipe thread: two 3/8" MPT @ 35c.) A $102.00

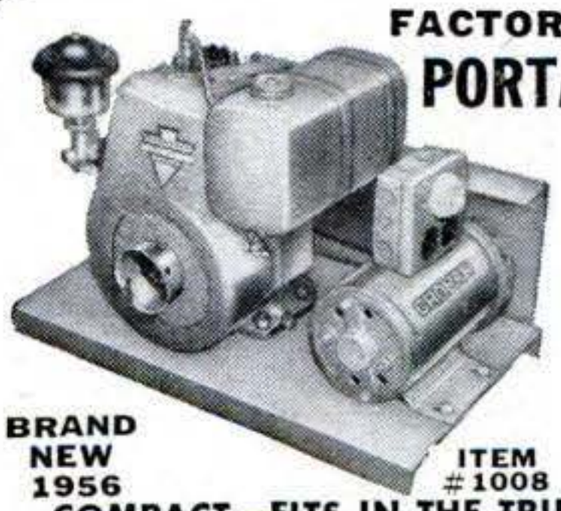
value. Shipping weight 11 lbs. FOB Chicago... **25.00**

ITEM #16-C—1 1/2" bore, 26" stroke. Will lift 1760 lbs. with 1000 lbs. pump pressure. Great for hay loaders, etc. 1" stainless steel piston rod. Postpaid.... **16.95**

ITEM No. 33C—1 1/2" bore, 4 1/2" stroke, alloy steel barrel, aluminum alloy ends, clevis mounting at both ends, lifting capacity 1760 lbs. in approximately 1/2 second using 1000 P.S.I., overall length closed 15 1/2". has 2—1/4" pipe thread ports. Postpaid. **8.95**

FACTORY-TO-YOU-VALUE

PORTABLE ELECTRIC LIGHT PLANTS



BRAND NEW 1956

ITEM #1008

POWER TO OPERATE:

- Electric Saw, Electric Drills, Pipe Bender.
- Refrigerator, Deep Freezer, Incubator.
- Water Pump, Radio, Lights, Air-conditioner.

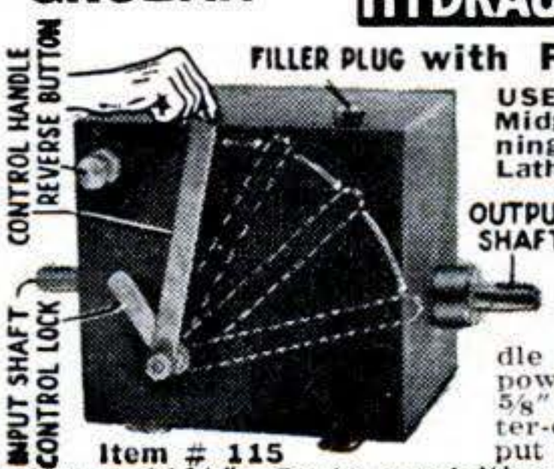
COMPACT—FITS IN THE TRUNK OF YOUR CAR

1000 WATTS OUTPUT, continuous duty. 115 Volts A.C. 60 cycles, 9 amps. Powered by husky, easy starting Clinton engine. Engine and generator operate at 3600 R.P.M. for maximum efficiency at minimum weight. Both units are mounted on steel base, with heavy sheet metal belt guard. Generator is self regulating, and is equipped with outlet box containing fuse and 2 A.C. convenience receptacles. Cost only 5c an hour to operate. Dimensions: Length 20 1/2", Width 12", Height 16". Shipping wt. 100 lbs. F.O.B. Chicago..... **149.50**

700 WATT—GENERATOR SET—same as above, slightly smaller—with Briggs-Stratton Engine—Model 708—F.O.B. Chicago..... **129.50**

GROBAN HYDRAULIC SPEED REDUCER

FILLER PLUG with FINGERTIP CONTROL



Item # 115

USE FOR: • Reamer Drives • Midget Cars • Feed Mills • Canning Machines • Conveyors • Lathes • Milling Machines • Motor Boats • Cream Separators • Garden Tractors • Pumps.

Variable output speeds from 0 to input speed available by moving control handle. Locking handle maintains setting. Use input power of 1/4 to 1 1/2 H.P. Shafts 5/8" diam. Input rotation counter-clockwise facing shaft. Input speed 750 R.P.M. 7 1/2" x 7 1/2" x 11 1/2". Gov't acquisition cost $428.00. Shpg. wt. 31 lbs. Complete with 2 qts. of oil and full instructions. F.O.B. Chicago..... **54.50**

U. S. NAVY ALL BRONZE CENTRIFUGAL PUMP

These all bronze Centrifugal Pumps are ideal for use as marine bilge pumps, circulating pumps, fire protection or irrigation, car-washing, dewatering, basement sump pumping, lawn sprinkling. Will pump water, oil, brine, gasoline, DDT and sulphur compounds. Equipped with 6" adjustable 'V' pulley, 2" dia. inlet and outlet, 180 GPM capacity. Inlet and outlet take hose with 2 1/4" inside diameter. Dimensions 11"x8"x11".

Total head-feet	Speed	H.P.	GPM
25	3600 RPM	3	180
35	3000 RPM	1 1/4	90
20	2400 RPM	1/2	75

ITEM # 384

Back plate may be rotated for most convenient inlet position. Shipping weight 31 lbs. Govt. cost 96.00. F.O.B. Chicago... **29.50**

FREE WINTER CATALOG

1956 EDITION, 52 PAGES, chuck-full of unsurpassed War Surplus Equipment Bargains for farm, home, factory, workshop. Write letter today. **To place phone orders—Call WEbster 9-3793**

SELF-PRIMING

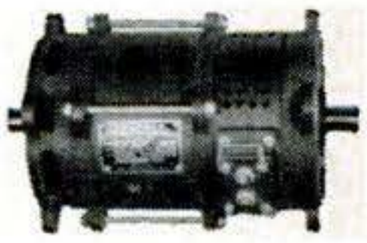
ROTARY PUMP

Item #104A — A fine pump for gasoline, fuel oil, water, kerosene. For fuel transfer, sump pumping, for draining basements. Capacity, 400 gallons per hour. 3/4" pipe thread inlet and outlet. Has built-in, adjustable relief valve, set at 30 P.S.I. Adjustable to 100 P. S. I. Rotation in either direction; use 1/4 Hp. motor; 1/2" standard shaft, ball-bearing supported. Dimensions: 5 1/2" x3 1/8"x10". Shipping weight 8 lbs. A $55.00 VALUE F.O.B. Chicago..... **16.50**

BRAND NEW 1 H.P.

12 Volt Electric Motor

- For electric wheel chairs (Pop. Mech. design—Mar.-'53).
- For electric golf carts.
- For self-propelled scooters, childrens midget cars.



ITEM NO. 308

Rated 1 H.P.,— 100 amps., 5600 R.P.M., 12 volts, D.C. — This double shaft motor of ball-bearing construction may be run on 6 volts for lower horsepower requirements. —Standard 5/8" shafts, nut and bolt electrical terminals, flange mountings—Dimensions: 9" x 4 1/2" x 4 1/2" Ship. wt. 19 lbs. A real value at..... F.O.B. Chicago **12.50**

BELT DRIVEN

A. C. GENERATORS

ITEM #700

Ideal for powering electric tools, oil burner, refrigerator, lights, or other appliances requiring up to 700 watts of power. **700 WATTS,** 115 Volts, 60 cycles A.C. 3600 R.P.M. Compact, self-regulating generator with V Belt pulley and double outlet receptacle. Rotation counter-clockwise. May be driven by tractor or auxiliary gasoline engine. Requires 2 HP minimum. Dimensions: 10" long x 8" high x 6" wide. Shipping wt. 27 lbs. F.O.B. Chicago..... **59.50**

Model 1010, 1000 WATTS Same as above. F.O.B. Chicago..... **79.50**

ORDER DIRECT FROM AD
SATISFACTION GUARANTEED
Send Payment Or Purchase Order Today

GROBAN SUPPLY CO. Dept. PS-12
1139 S. WABASH AVE., CHICAGO 5, ILL.

NOW-THE QUICK-WAY TO SHARPEN ALL CIRCULAR SAWS

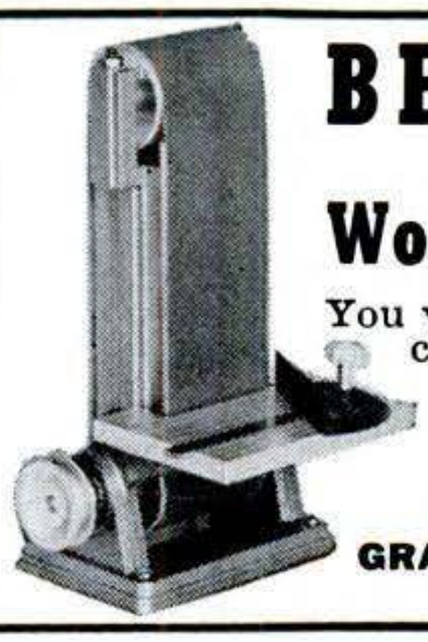
NEW

Model PG-12 Complete No extras to buy. **$16.50** Postage Paid

Model PG-12 sharpens, joints, gums, and retooths all cross cut, rip, combination, miter, and planer blades up to 12" in diameter. Two precision index plates give versatile, accurate sharpening. Guarantees precise spacing of teeth. New safety rest prevents tilting and gouging of blade. Save time and money. Special $3.00 grinding wheel also included for use on your own power table. Fits regular or radial swing tables.

Order today. Send check, cash, or money order. We pay postage.

QUICK-WAY SAW CO.
100 Hornby Drive, Painted Post, N. Y.



BELT SANDER

for

Wood, Metal, Plastic

You will find this the handiest machine in your workshop. Standard 3x24 Belt. List Free.

Price **$19.95** Post Paid

Satisfaction Guaranteed

GRAY BROTHERS MACHINE CO.
NEDROW 5, N. Y.

Copyrighted material

Make $20 to $30 a Week

EXTRA MONEY

MACHINE SAW FILING

PAYS UP to $3 or $5 an HOUR

• Turn your spare time into CASH—sharpening saws with a Foley Automatic Saw Filer pays up to $3 or $5 an hour. You will find you can make $20 to $30 a week in your spare time as a starter.

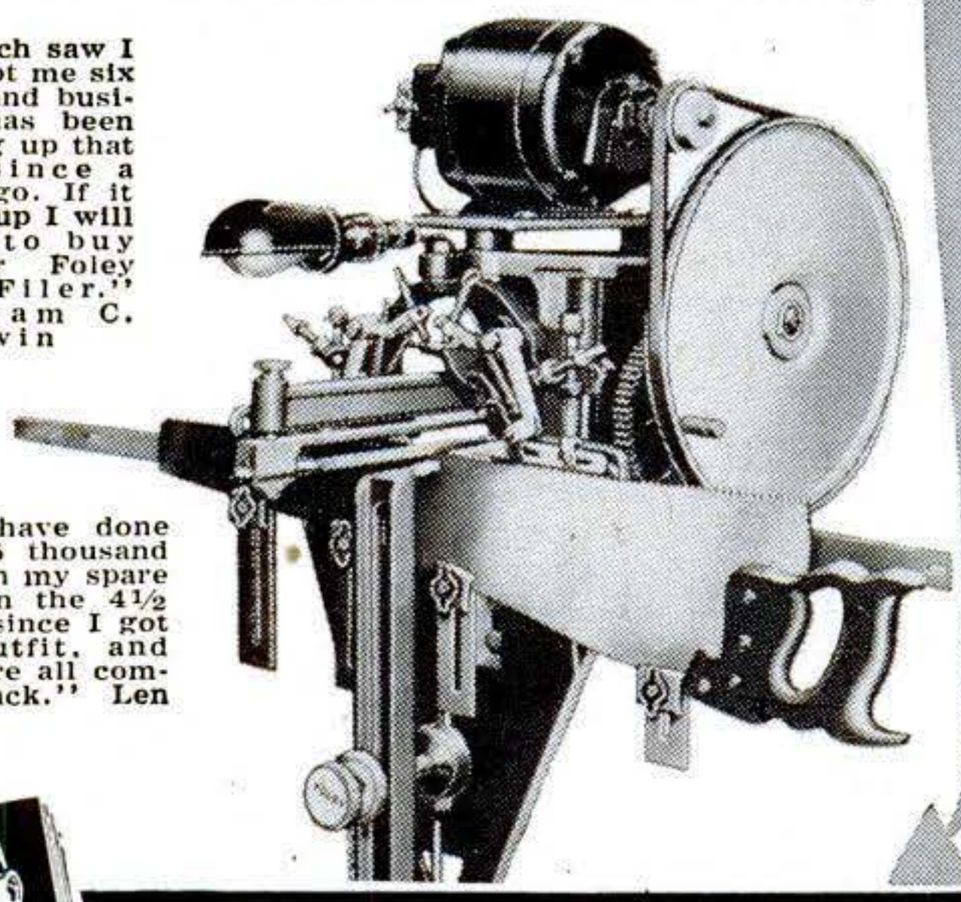
You can work in your basement or garage—no experience necessary. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons. No canvassing—"I advertised in our local paper and got in 93 saws"—says M. L. Thompson. The Foley is the only machine with which you can file all hand saws, also band saws and cross-cut circular saws.

SEND FOR FREE BOOK

"MONEY MAKING FACTS"

Shows how you can get business from home owners, farmers, carpenters, schools, factories, etc. With a small investment, no overhead, no stock of goods to carry, you can get right into a cash business,—and possibly later on develop into a full-time repair shop. Send coupon today for Free Book. No salesman will call.

"Each saw I filed got me six more and business has been picking up that way since a year ago. If it keeps up I will have to buy another Foley Saw Filer." William C. Baldwin



"I have done 4 or 5 thousand saws in my spare time in the 4½ years since I got the outfit, and they are all coming back." Len Crego

Send Coupon for FREE BOOK

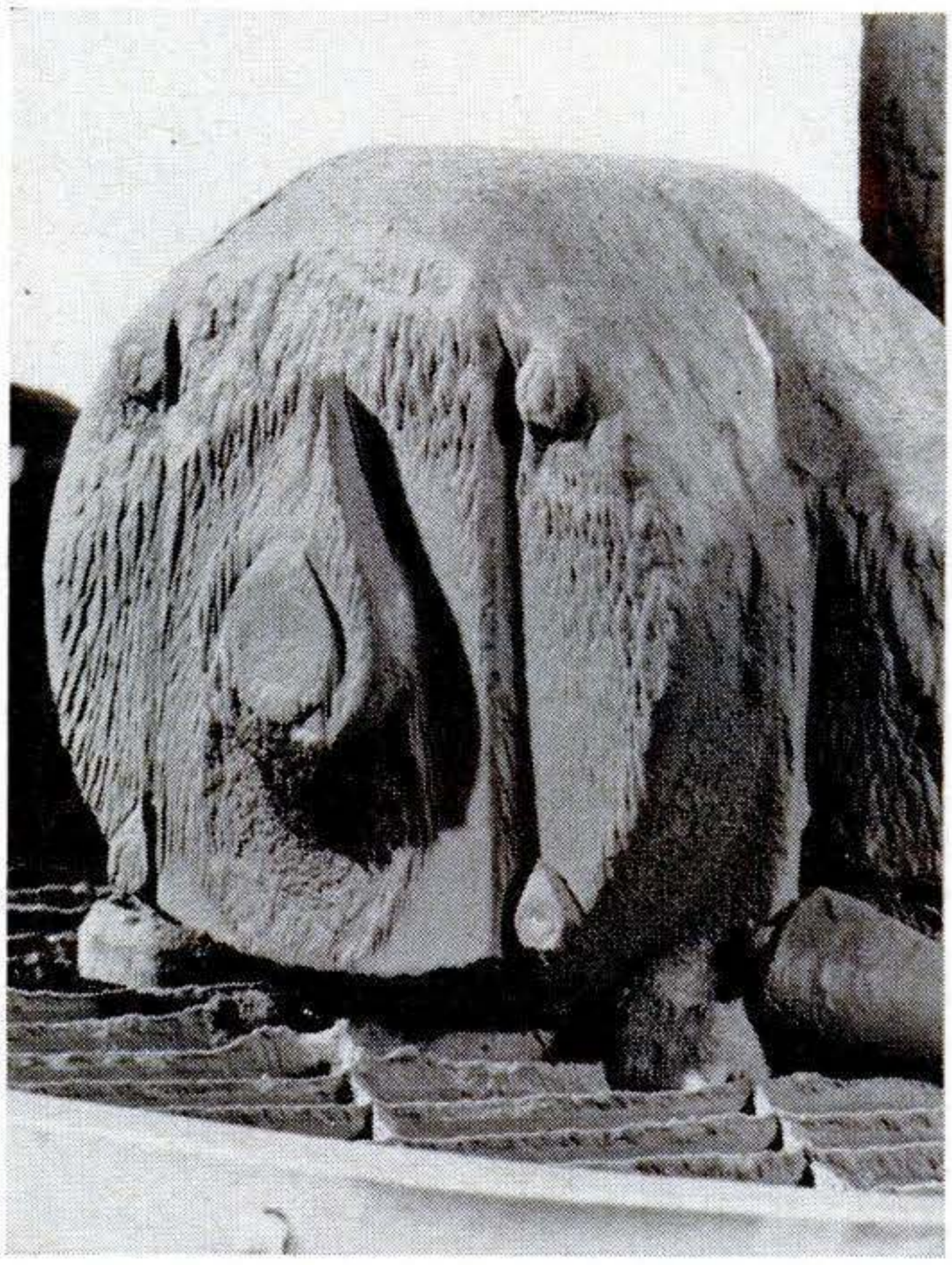
FOLEY MFG. CO., 1219-5 Foley Bldg.
Minneapolis 18, Minnesota
Send FREE BOOK—"Money Making Facts."

Name.....

Address.....

Air-Raid Truck Puts Out Fires

REMEMBERING its bombed cities, West Germany's civil defense organization has come up with a water-tank truck that can plow through pitted and rubble-covered streets to a blaze. It carries several high-pressure pumps and an assortment of hoses.



Dust Sculptures Wilted Walrus

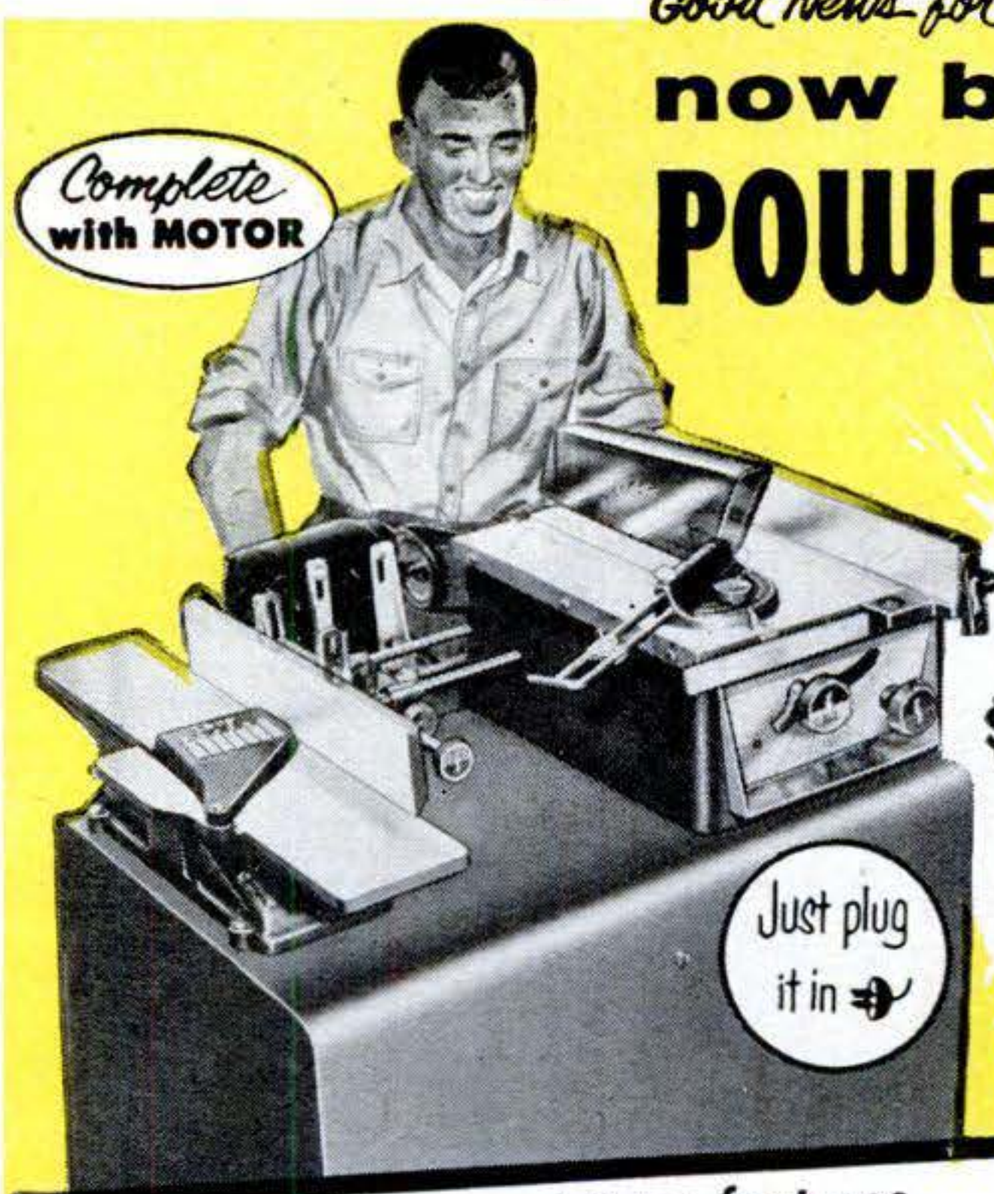
THIS melted, mournful-looking creature is neither man nor beast, but a piece of commonplace machinery that has just taken a beating. The photo shows a small GE electric motor after completing a 230-hour "dust test." Despite its sad appearance, the motor was still humming happily.

Copyrighted material

Good News for budget-minded HANDYMEN...

now buy this basic

POWER TOOL WORKSHOP



for only

$17.50 DOWN

and small monthly payments

IT'S THE NEW

Shopmaster

SAW-JOINTER COMBINATION

Now you can buy Shopmaster tools on the famous GECC Handyman payment plan. Pay only 10% down and balance in up to 18 months. Buy the Shopmaster Saw-Jointer combination or any Shopmaster tools totaling more than $60 on this wonderful handyman payment plan. It's Shopmaster's way to give you tomorrow's power tools right now!

GENERAL ELECTRIC GECC CREDIT CORPORATION

Look at these saw-jointer features

- Ready to plug in
- Handy switch in front
- Complete with ½ HP motor
- 8" saw with 2½" depth, 13"x16" table size, mitre gauge and rip fence
- 4" jointer-planer with ⅜" cut, 4"x26" table and flexible guard
- All steel stand 26"x34" and 36" high
- Sealed-for-life ball bearings
- Complete only $174.50

Shopmaster Power Tool Catalog

It's America's Greatest Power Tool Value!!

WRITE FOR FREE CATALOG

Shopmaster

ROOM 11E, 1214 SO. THIRD ST., MINNEAPOLIS, MINN.

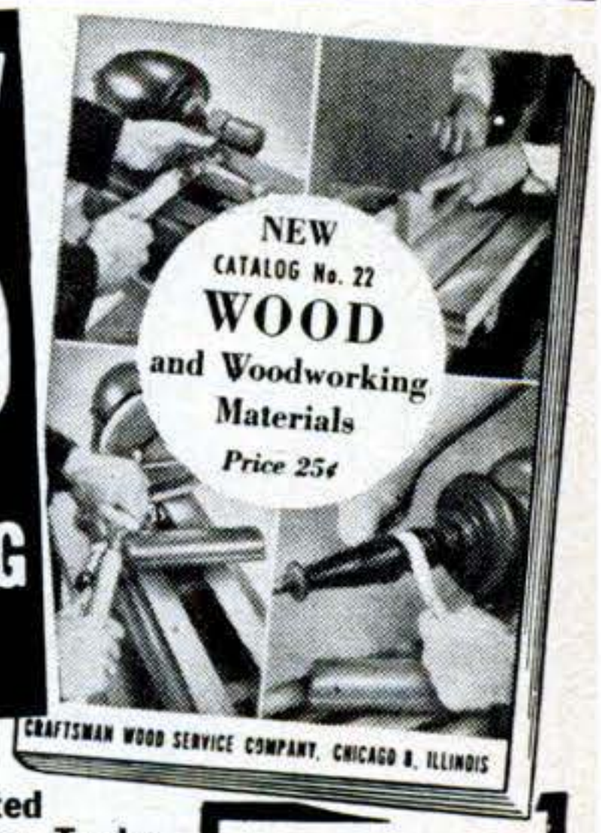
DOES MORE JOBS EASIER — THAN ANY OTHER TOOL MADE!

VISE-GRIP

A gift to make any man happy, handy, "hep" at his fixin'! A whole tool kit — in one tool! Jaws **lock** onto work with **one-ton** pressure. Quickly adjust—for use as a Super-Pliers, All-Purpose Wrench, Clamp and Wire Cutter. 7" and 10", cutter optional. Only $1.85 to $2.60 at your hardware store.

PETERSEN MFG. CO., Dept. P-12, DeWitt, Nebr.

Get This NEW Catalog of WOOD AND WOODWORKING MATERIALS



World's Largest Selection of Finest Domestic and Imported Woods . . . Mouldings, Hardware, Tools, —ALL AT LOW MONEY SAVING PRICES!

Your complete wood buying guide and project book. Craftsman is your best, most complete source of finest kiln-dried domestic and rare imported woods, beautiful wood inlays, colorful bandings, matched plywoods, embossed mouldings, carved ornaments, newest woodworking tools, "hard to find" cabinet hardware and fittings . . . more than 1,500 items! Packed with newest scroll saw patterns, project ideas & money making plans. Enclose 25c (refunded with first order) to help pay mailing, handling cost. Write now!

Craftsman Wood Service Co., Dept. B-12, 2729 S. Mary Street - Chicago 8, Ill.

128 PAGES
Many in full color
packed with rare, fancy & imported woods . . . veneers, plywoods, patterns, tools, ornaments, hardware . . . everything for the woodworker.

MAIL COUPON NOW!

CRAFTSMAN SERVICE CO., Dept. B-12,
2729 S. Mary St., Chicago 8, Ill.

Enclosed find 25c. Rush me new *Woodworkers' Catalog Handbook.*

NAME_____

ADDRESS_____

CITY_____ZONE____STATE_____

Copyrighted material

[*Continued from page 148*]

The national average octane for regular gas during the month of September, 1955, was 88.8. That for premium gas was up to 96.

While the quality of the gas was going up, the automobile manufacturers proceeded to build "mechanical octanes" into their engines.

Valves are bigger. They rise higher off their seats. They "dwell" longer—stay open for a greater length of time. Bores are wider, but strokes remain about the same, year to year. That boosts the "mechanical efficiency" of an engine—it wastes less energy on its own friction.

Engines are "ventilated" better. ("If anyone had told us as late as four years ago," remarked one power-plant man, "that we could ventilate an engine as we're doing today, we'd have thought he was crazy.") Carburetors are bigger. Intake and exhaust manifolds are larger. Compression ratios, of course, steadily go up. Olds' for '56 is at 9.25:1.

Piston rings leak less gas into the crankcase on the power stroke. Combustion chambers are smaller. Engine-head temperatures (the usable heat) are higher. And when the exhaust valve closes, there is less residual burned gas left in the cylinder.

Olds had its bloopers. These began popping up months before the 1949 engine appeared in auto showrooms.

The bottom faces of the hydraulic valve lifters got scored and pitted on the steel cam being used. The metallurgists did a second take, replaced the steel cam with one of cast iron and gave the lifter a chilled alloy iron body. That fixed that. The whole industry copied it.

Cast-iron rings got worn, and leaked as compressions went up. Chrome plating mended that. The push rod on the fuel pump, mounted at the top of the engine, got hot, expanded, rubbed, and starved the cylinders. They relocated the pump.

[*Continued on page 274*]

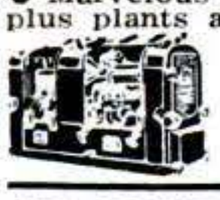
Copyrighted material

GIGANTIC SAVE-TO-70% MAIL SALE

WAR SURPLUS
EXCESS INVENTORY
BANKRUPT STOCK

ARMY POWER PLANTS

● Marvelous buys in new condition Govt. surplus plants and generators. We pay freight!



- 1000-w, 115-v, 60-c, **$149.50**
- 2000-w, 115-v, 60-c, **$289.50**
- 3000-w, 115-v, 60-c, **$349.50**
- 7500-w, 115-v, 60-c, **$590.00**
- 3000-w, DC generator **$58.75**

AIR COMPRESSORS—TANKS, Etc.

Save to 70% on air fittings, tanks, compressors, etc. See our catalog.

- **Piston Air Compressor, 150 lb. . . $18.91**
- **Air Corp 300-lb. Pressure Tank . . . $ 6.79**
- **Auto Pressure Switch for Motor . . . $ 4.95**
- **Professional Paint Spray Gun . . . . . $ 9.95**
- **DeLuxe Air Kit complete $45.49**

NAVY CETRIFUGAL PUMP

● Leading make. All bronze ball bearing hi-capacity. Complete with pulley. 1½" inlet, 1¼" outlet. ● Will pump up to 140 GPM. Pressures to 65 ft. Suction lift to 18 ft. Gov't. Cost $65.50. Prepaid. **$24.61**

HYDRAULIC BARGAINS

- **Pump,** 1000 lbs., 12 g.p.m., 400 r.p.m. **$45.50**
- **Cylinder,** 3" bore, 24" stroke, 7000 lb. lift **$39.90**
- **Cylinder,** 2" bore, 10" stroke, 3141 lb. lift. Sale **$16.50**
- **Control Valve,** For single or double acting cylinders. Sale . . . **$17.98**
- **Pressure Gauges,** 1000 lb., 1500 lb., 2000 lb. **$3.49**

HAND HYDRAULIC SYSTEM

● Build your own arbor press, wagon unloader, shop tool tester, etc. Genuine brand new Blackhawk hi-pressure hydraulic pump system. Complete unit including reservoir, check valve, etc. Will develop pressure to 8,000 lbs! Wt. 35 lbs. Gov't Cost over $100. Prepaid **$23.95**

6-Volt HYDRAULIC PUMP

● Complete hydraulic system. 6-v DC motor operates from truck battery. Drives 2,500 lb. per sq. in. pump. Has control valve, etc. ● Use for dump trucks, snow plows, jacks, lifts, special machinery, etc. Leading make. F.O.B. Wt. 48 lbs. List $121.50. SALE **$45.50**

SPECIAL LISTINGS

We list below some super prepaid-to-you bargains available in limited quantities only.

- **$150 G.E. Experimental Amplifier . . $6.97**
- **$15 Gov't. Sleeping Bag with Cover $5.74**
- **$3 Finest Wood 1"x16" Chisels $1.19**
- **$150 5-Row Weed Spray Outfits . . . $97.65**
- **$30 Electronic Experimental Kit . . . $4.99**
- **$15 Army First Aid Chests $6.95**
- **Eastman Film and Paper**—savings to 70%!

ELECTRONIC AUTOMATIC TIMER

● Genuine Telechron 115-volt, 60-cycle Clock Timer in beautiful red onyx case. Will handle 1000-watt load. Set for any time 0 to 15 minutes. Turns power off at proper time. Has pilot light and alarm buzzer.

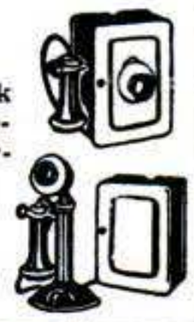
● Many experimental and laboratory uses. Use for photography, sun lamps, timing studies. List $19.95. Sale . . . . **$4.95** Prepaid

PORTABLE DUAL AMPLIFIER

● Telephone repeater. Used to amplify voice in both directions. Consists of two one-way hi-gain amplifiers, filters, equalizers, keys, etc. Operates from low drain batteries.

● Wide variety uses including telephone amplifier, wire tapping, audio oscillator, etc. Excellent experimental laboratory unit. Brand new and with Gov't. data book. Govt. cost over $350. SALE . . . . . **$13.51** Ppd.

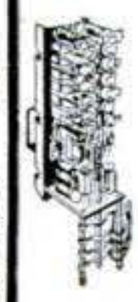
WESTERN ELECTRIC CITY TELEPHONES



● Genuine W.E. wall or desk phones, same as used on city telephone systems. Useful for intercommunication, private system, extension ringer, etc. Specify "wall" or "desk." Original cost over $20.00. Prepaid Sale, **$4.99** each. Two for **$9.69.**

SPECIAL OF THE MONTH!

Automatic Remote Control Switches



● Amazing electro magnetic switch. Complete with dial. Any circuit from 1 to 100 can be selected simply by dialing the number, uncanny response. Will work over lines up to 20 units. Used, excellent. ● Fine for inter-coms. Private automatic phone systems, remote control, experimental, etc.

New Cost Over $200.00. Sale, **$13.71** Ppd.

CONTRACTOR-ARCHITECT LEVEL

● Excellent highly accurate professional instrument made by leading manufacturer. Ideal for setting foundations, grading, farm contouring, surveying, etc.

● Powerful erecting optical telescope, polished graduated degree scale, sensitive spirit bubble, etc.

● Furnished complete with 8½-ft. 3-sec. rod, fine tripod and polished wood carrying case. Our 4-star buy! Prepaid to you **$39.15**

HI-INTENSITY FLOODLIGHTS

● G.E. Sealed Beam air force long-life extra hi-intensity parabolic precision reflector units. 24-v, 250-w, 8" size. Equivalent 2500-w ordinary lite. Use 5 in series on 110-v. for 800,000 candlepower illumination effect. Light building fronts, parking lots, ball parks, constr. jobs. Original cost, 5 units, $39.00. SALE, 1-unit, **$1.95.** 5-units, **$7.49.**

CAR BATTERY SEARCH LIGHT

● Hi-intensity 6-v one mile beam. With case, colored filters. Ideal for camp, flat tires at night. Cost over $30. **$4.96** Ppd.

SPECIALS FROM PREVIOUS ADS

- **110-V Selsyn Motors . . . . . Pr. $12.97**
- **Finest Heavy 10x12-ft. Tarps $11.99**
- **AC-DC Power Rectifier $15.61**
- **Finest 7x50 Binoculars $36.95**
- **Gov't. Prismatic Periscopes $2.99**

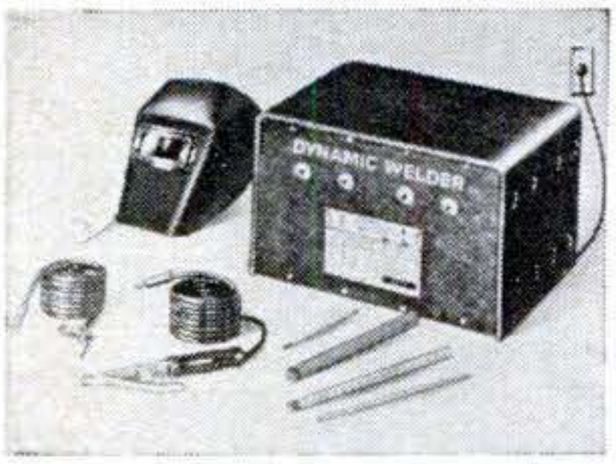
We pay transportation to you except where stated "FOB Lincoln." Write for large FREE Catalog.

FREE CATALOG

BURDEN SALES COMPANY
834 "O" ST. LINCOLN, NEB.

The CHRISTMAS GIFT for Lifetime Enjoyment

WELD IT YOURSELF IN A JIFFY!



Weld, Cut, Braze, Solder; Iron, Steel, Brass, Bronze, Aluminum and other metals safely and easily. Make your wrought iron furniture, porch railings, fences, knick-knacks and other metal specialties. With this fine equipment anyone can do professional-like work with little practice. The Dynamic is an industrial type transformer arc welder designed to operate from any properly wired 110 volt AC line.

NOW as a FALL SPECIAL you will receive an $8.00 Twin Carbon Arc Torch FREE to complete your welding workshop. Order TODAY!

Literature on larger equipment available on request.

EASY PAY PLAN

Low down-payment. Pay as you weld. Money back guarantee. Complete outfit including special FALL GIFT.

Only $38.50

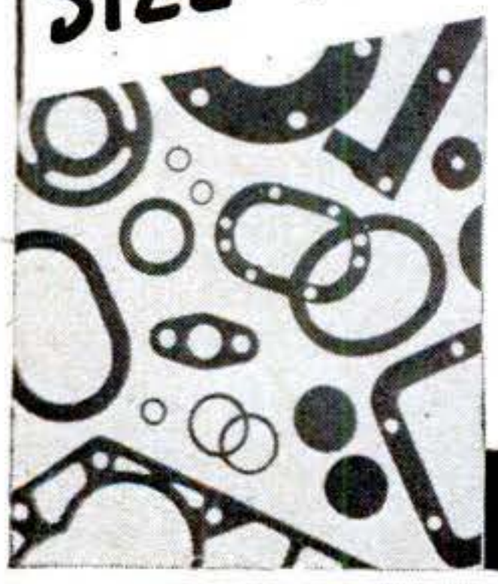
F.O.B. Factory

DYNAMIC WELDER COMPANY, 1808 S. Federal Street, Dept. D3-N, Chicago 16, Illinois

---

CUT ANY SIZE-ANY SHAPE-with the SPEARHEAD CUTTER

ORDER TODAY



★Accurately cuts circles from ¼" to 6" . . . odd shapes, straight pieces any size. ★Quickly, easily cuts gaskets, discs, washers, shims, patterns — from leather, rubber, asbestos, or any pliable sheet material. ★In use the world over . . . by some of the largest companies.

Long lasting blades of tempered steel. Durable cutting pad included.

COMPLETE:

Model A-14 Cutter, pivot pins, blades, cutting pad.

ONLY 14.50 Postpaid

Send Check or Money Order . . . Satisfaction Guaranteed.

Zimmerman PACKING CO. CINCINNATI 12, OHIO

ZIMMERMAN PACKING CO.
CINCINNATI 12, OHIO

Send me the Spearhead Cutter, including blades, pivot pins, and cutting pad. My $14.50 is enclosed.

NAME .....

ADDRESS .....

CITY ..... STATE .....

I'm sending ☐ check - ☐ money order.

Copyrighted material

WAR SURPLUS AND OTHER BARGAINS SAVE UP TO 90%

P1 GENERATORS

Electric . Auto-Lite. 200 Amps. 24 Volt. 4400 RPM. Dandy arc welder. Wt. 53 lbs. Approx. GOVT cost $450. Like NEW. **$12.50** incl. easy diagram.

SENSATIONAL GENERATOR BUY!!

Famous Navy NEA-5 Generator. Combination AC-DC Type. AC voltage—115 V. DC voltage —24 V. 200 Amp. 2 complete generators in 1 . . . 2 separate fields and 2 separate armatures on same shaft yet no larger than regular aircraft generator. Ideal for home, farm and shop lighting plants by hooking wires to AC side. DC side can be used for welding and operating war surplus low voltage hobby motors and equipment. Weight 54 lbs. NEW. Approx. GOVT. COST $350. NEW $27.50 used perfect $18.00

SPECIAL CARBON PILE TYPE VOLTAGE REGULATOR

to go with above generator. Incl. mounting base and completely enclosed in steel-mesh box. Helps maintain constant current and prevents pulsation. Ideal for installation with above generator for lighting plant. Wt. 5 lbs. Complete NEW. Approx. GOVT. COST $90. Now only **$7.95**

BUY EM BOTH SAVE $5.45! Generator & Regulator together $30

NEW PUMP AND MOTOR

Pump has 1" connections, built-in relief valve, adjustable up to 1500 lbs. Max capacity 6 GPM. 1½ H.P., 24-volt motor. 4000 RPM. Can be used on 12 or 36 volts. Govt. cost approx. $350 — our price — NEW — **$9.95.**

SENSITIVE ALTIMETER

in 10 Ft. Increments. Famous Pioneer! 0 to 35,000 ft. (inches of Mercury). Tested and inspected in our own instrument lab. Guaranteed perfect. Approx. Govt. Cost $150. NOW ONLY **$13.95** PREPAID!

MICROMETER DEPTH GAUGE

With 3 rods to measure all depths from 0 to 3 inches by thousandths. Hardened tool steel lead screw has full 1 inch run. Base is 2½" long, hardened ground and hand lapped. Accuracy guaranteed. Mfd. by Millers Falls Co. GOV'T COST approx. $30. NEW—**$10.95** ppd. USA. In velvet case.

MICROMETERS Chrome plated, precision engineered, carefully tooled to give long life. All new 0-1" cap. **$2.25** ea., 1-2" cap. **$3.50.**

NEW IMPROVED MODEL MAUSER-TYPE PRECISION 1/1000" VERNIER CALIPERS

Quick, handy, accurate. 6" Vernier Calipers. Glass hardened, lapped measuring surfaces. Fine engraved scales—1/1000" and 1/128" for inside, outside & depth measurements. Friction thumb release. Larger capacity. 2 gib adjustments. Reg. $25. Now only **$7.95.** Leather case $1 extra.

PORTABLE POWER PLANT

Ideal for light welding. For boats, camps, emergency lights, battery charger. 2000 W. 30 V. 5 HP. Complete with carbon pile voltage regulator and ammeter. Like new, tested. Shock mounted. Deluxe type. Approx. Govt. Cost $700. Shpg. Wt. 200 lbs. **$72.50.**

NEW 1955 CATALOG Biggest ever . . . new low prices . . . Send 25c for your copy today: Prices F.O.B. Culver City unless otherwise stated. Check, money order or cash. 25% deposit for C.O.D.

AIRBORNE SALES CO., INC. DEPT. PS-1255
8501 Stellar Drive, Culver City, Calif.

KING MIDGET—WORLD'S LOWEST PRICED CAR

Lower priced, improved performance. Drive it for 75c per week. Also KING MIDGET JUNIOR, finely engineered, less than one-third cost of any comparable car, one twelfth cost of large cars. Agents wanted. IT WILL PAY YOU TO GET THE FACTS. Send 25c for literature and agents proposition on both cars, or $1 (refunded first order) for this plus actual assembly book and service manual.

MIDGET MOTORS MFG. CO., ATHENS 2, OHIO

QUALITY UNSURPASSED— PERFORMANCE UNEQUALLED

Yet Cost No More Than Ordinary Screwdrivers!

HOLD-E-ZEE

The Original AUTOMATIC GRIP SCREWDRIVERS

Much Wanted Special Features

EXCLUSIVE **LOK-BLOK**™ Makes Blade Twist & Impact Proof • AT ALL LEADING DEALERS

UPSON BROS., INC., ROCHESTER 14, N.Y.

BUILD YOUR OWN GEIGER COUNTER!

Find rich URANIUM ores with this genuine OREMASTER kit! Assemble from easy-to-read photo-drawings. All materials, including big 4½-in. meter, speaker, tubes, batteries, aluminum case. Chassis wired, pre-tested. You'll have a counter fully comparable to $200 instruments. Fully guaranteed. **$59.50** prepaid

WHITE'S ELECTRONICS
1218 Main St. Sweet Home, Oregon

BUILD YOUR OWN

ARC·WELDER FROM AIRCRAFT GENERATOR

For Light or Heavy Work

We show you how to build 75-350 amp. D.C. welder for your shop or farm from war surplus aircraft generator. No rewinding necessary. Guaranteed workable. Easy and cheap to build. **PLANS 35c.** Send today and we'll include **FREE** LeJay's **"How to Weld"** booklet (regularly 50c) and **Big War Surplus & Electrical Catalog.**

LEJAY MFG. CO. 1223 LeJay Bldg., Minneapolis 8, Minn.

$6.95 DRAINS cellars, cisterns, wash tubs; IRRIGATES - CIRCULATES - SPRAYS

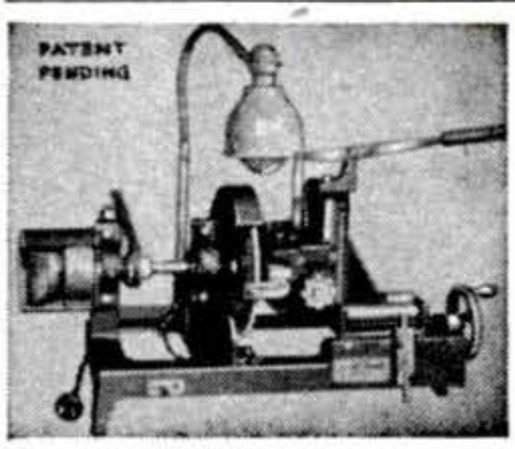
1,001 USES—HOUSE, GARDEN, FARM

Original All-Purpose Pump has 3,000 GPH capacity. 450 GPH 80' high; or 1800 GPH from 25' well. Use any 1/6 to ¾ HP motor. Stainless steel shaft. Oil-less bearing. 1" inlet; ¾" outlet. Motor coupling included.

DOES NOT CLOG OR RUST

Postpaid if cash with order. (West of Miss. add 50c.) MONEY BACK GUARANTEE. Larger Centrifugal Pumps and Gear Pumps in all sizes.

LABAWCO PUMPS, Belle Mead 3A, N. J.



Start a NEW BUSINESS

or Add to your present Repair Business

SHARPEN DULL PIPE WRENCHES
PIPE TAPS & DIES
"GUM" CIRCULAR SAWS
Also MOTOR DRIVEN ROTARY HONE

Write for Information

J. C. MOORE INDUSTRIES
Box S 276, Fredonia, Pa.

STUDENTS • ARTISTS • DRAFTSMEN • ARCHITECTS • ENGINEERS • CONTRACTORS • SALESMEN

DRAFTETTE CUTS DRAWING TIME IN HALF, IMPROVES ACCURACY—NEATNESS

Speeds up sketches of any kind! A precision-accurate portable drafting machine that clips on any tablet, sketch pad, notebook. Covers area to 11" x 17". Eliminates need for ruler, protractor, T square, triangle. Compact, lightweight, made of sturdy anodized aluminum. Carry in pocket, briefcase, etc. Last a lifetime. Order Now! Cash, Ch., M.O., postpaid. . . **$3.95**

Dealer jobber inq. invited.

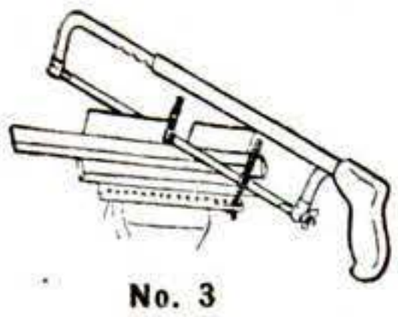
BAUMBACH ENGIN. CO. Dept. PS-512—10147 Halbrent San Fernando, California

Copyrighted material

FIRST AID TO SAW BLADES!

No. 1

No. 2



No. 3

1. **CIRCLE SHARP.** Sharpens circular saw **perfectly . . . and in a jiffy.** Holds the blade securely and guides the file at correct angle for sharpening all saw blades from 6"-10" diam.,—including cross cut, rip, combination and planer blades **$5.95**
2. **CIRCLE SET.** Resets teeth of your circular saw blades quickly and easily. Sets any saw blade up to 18" without removing it from its arbor **$1.50**
3. **MITER-ALL.** Enables you to cut accurate miters in metal, as well as wood, with your hacksaw. Can be clamped in a vise or fastened to work bench. Cuts stock up to 1½"h.x 2"w., from 90 degrees to 45 degrees in steps of 5 degrees **$4.35**
4. **GRIND-IT** assures correct angles for grinding cutting tools. This lightweight jig handles joiner blades, wood chisels, cold chisels, drills, etc. during straight or hollow grinding (not illustrated) . . **$5.95**
5. **BANDSHARP** sharpens bandsaw blades speedily by sharpening 3 teeth at a time. Suitable for wood-cutting blades 3/16"-1¼" w. (not illustrated) **$3.95**

Quality Products Made of Quality Materials

All tools sent postpaid. 10-day money-back guarantee. For additional labor-saving tools not listed above, write for free literature.

RIVERSIDE ENTERPRISES

14-P RIVERSIDE, CORNING, N. Y.

NEW '56 CATALOG

NEW '56 MODELS

BOAT KITS

BUY DIRECT-SAVE UP TO 2/3 !
FACTORY-TO-YOU! No Dealers

You SAVE the PROFIT

Save on the finest quality boat kits. Lowest prices in history. Mahogany decks, brass screws, easy to build. 23 models 8-19' All types!

SEND 10¢ FOR 1956 KIT CATALOG!
Includes Fiberglas-Accessories-Trailers, etc.

BOAT PLANS

OVER 50 PLANS with FULL-SIZE PATTERNS

Send 10¢ for NEW PLAN CATALOG. Build your boat from modern, easy-to-follow plans with patterns. Saves time and money! All types included: Prams to Cruisers from 6' to 25'

CRAIG-CRAFT (DEPT.30) TONAWANDA, N.Y.

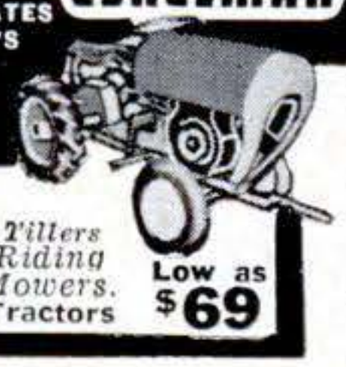
---

2 Passenger "Eshelman" SPORT CAR & Golf Cars
1/5 the cost of any other auto
70 Miles per Gal.
Free Catalog

RAKES
PLOWS
CULTIVATES
HARROWS
HAULS
SPRAYS
SAWS
DOZER
MOWS
CUTS
ROLLS
TILLS
SNOW
PLOW

ESHELMAN

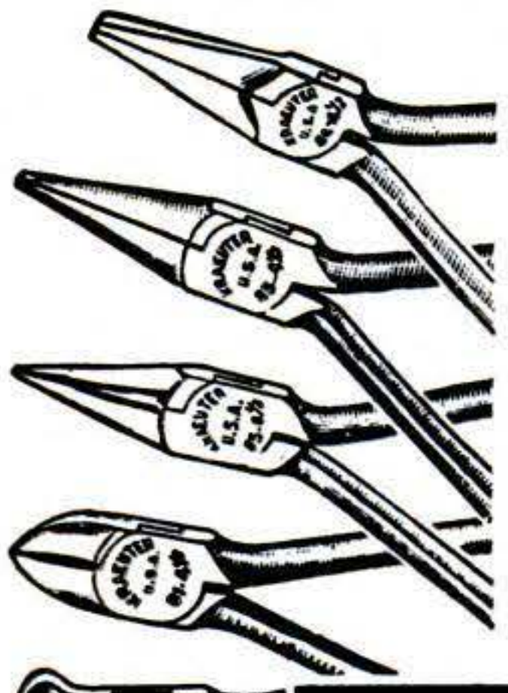
FOR Better LAWNS And GARDENS



Tillers Riding Mowers. Tractors

Low as $69

Women can operate it.
1 to 8 H.P.
Shipping Points:
BALTO., CHICAGO, RENO
Free Catalog Write:
ESHELMAN CO.,
Dept. R-412
109 Light St., Balto. 2, Md.



PRECISION PLIERS

• *For accurate, exacting work use the fine, small pliers jewelers and watchmakers use — Kraeuter's Precision Pliers. Matched in size and handle shape, drop forged from selected tool steel, machined and heat treated to exacting specifications. For hobby crafters, model builders, TV and radio technicians.*

Buy wherever fine tools are sold in U. S. and Canada.

KRAEUTER

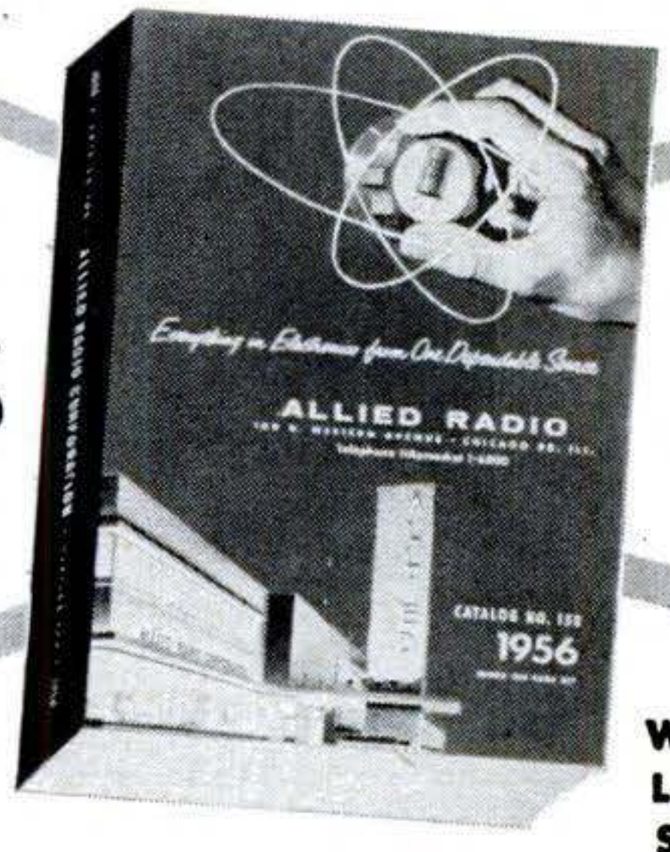
---

free GET THE WORLD'S LEADING TV & RADIO PARTS AND EQUIPMENT CATALOG

ALLIED'S 1956

ELECTRONIC SUPPLY GUIDE

324 VALUE-PACKED PAGES



Save on Everything in Electronics

WORLD'S LARGEST STOCKS

Everything for Experimenters, Builders, Amateurs, Servicemen, Engineers and Hi-Fi Experts

Send for ALLIED's big 324-page Catalog, offering the world's largest selection of latest top-quality electronic equipment at lowest, money-saving prices. Features High Fidelity systems and components; recorders and phono equipment; TV tubes, antennas and accessories; Amateur station equipment; P.A. systems; test instruments; latest build-your-own kits; industrial electronic supplies—plus thousands of parts, tubes, transistors, tools and books. Get *everything*, get *more* for your money—send today for your FREE 1956 ALLIED Catalog!

ALLIED RADIO

Send for FREE CATALOG

ALLIED RADIO CORP., Dept. 7-MM-5
100 N. Western Ave., Chicago 80, Ill.

☐ Rush FREE 1956 ALLIED 324-Page Catalog

*Name*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

Copyrighted material

The Chief's

WORK BENCH

Built to Last a Lifetime!

With Bottom Shelf and 18" Sq. Drawer. 2"x6", Solid Plank, Grooved and Dovetailed Top and 1"x8" Back Rail, Shellacked to a Smooth. Satiny Finish.

MOHAWK LUMBER CO. Dept. 32
14525 W. Chicago Blvd. Detroit 27, Mich.
Enclosed☐Check☐Money Order for $.....
Ship.....CHIEF WORK BENCHES at
Quantity
$19.95 each, F.O.B. Detroit, Mich.
☐Send C.O.D., $5 Deposit Enclosed.

NAME.....
ADDRESS.....
CITY.....STATE.....

• 6 Ft. Long • 34" High • 26" Deep. Shipped Knock-down, with Bolts, Nuts and Screws and ABC Chart for Quick, Simple Assembly.

Prompt Delivery

MOHAWK LUMBER CO.
14525 W. Chicago Boulevard
DETROIT 27, MICHIGAN

Send Check or Money Order, or Will Ship C. O. D (S5 Deposit)

Loosens Rusted Bolts
nuts . . . screws . . . parts

LIQUID® WRENCH

AT HARDWARE STORES, GARAGES, FILLING STATIONS EVERYWHERE

For information write manufacturer

RADIATOR SPECIALTY CO.
Charlotte, N. C.

Guaranteed original equipment Replacement Auto Parts . . . at

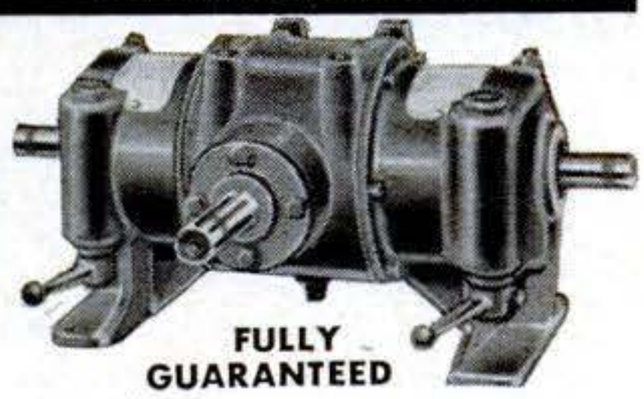
Western Auto

SPEED REDUCER-CLUTCH COMBINATION

Farm and Industrial **TRANSMISSION**

Brand New SURPLUS!
Gov. Cost $262.00
only $69.50 PREPAID

Speed Reducer Alone worth triple this price!



- ***Reduces speed at a 3-to-1 Ratio***
- **2 Independent Outlet shafts, each separately controlled by its own Clutch**
- **Rated up to 3.6-HP (electric) or 7.5-HP (gas engine)**
- **Ball and Taper Roller Bearings thruout for smooth, quiet operation**

There are unlimited farm and industrial uses where this SPEED REDUCER-CLUTCH COMBINATION can be utilized when low speeds are required—for starting heavy loads—or—for engaging and disengaging machine operation without stopping the input drive. Use with any ¾-HP to 3.6-HP motor (or 1-HP to 7½-HP engine). With input speed of 1800 RPM, ratio of 3-to-1 gives approx. 580 RPM output speed (or can be belt driven to give any desired speed). Clutches are of double disc design with non-burning asbestos friction rings . . . and have simple one point adjustment to take up for any wear. Close grain cast iron and steel construction. Standard foot mountings.

Can be easily adapted to present drives—or for building special equipment that increases production and saves valuable man hours. A unit of this type is rarely available and hard to obtain AT ANY PRICE! Its versatility makes possible the mechanization of operations that would ordinarily be too expensive to modernize. Some of the countless applications are: machine tool drives; construction and farm machinery and equipment; winches, lifts, hoists, etc. A REAL ENGINEERING ACHIEVEMENT IN EFFICIENCY AND COMPACT DESIGN. Weight 108 lbs. Approx. size, 17½" long x 8" wide dia.

ORDER DIRECT FROM AD! We Pay Shipping Costs!

FREE Catalog of Hydraulics, Generators, Other SURPLUS

ROBERTS ELECTRIC CO., Dept. PS-344, 849 W. Grand, Chicago 22

When Writing to Advertisers Please Mention Popular Science

He's alive . . . and you helped

People still die from tuberculosis—this year one American every twenty-seven minutes!

Yet the money which you give for Christmas Seals has helped to save thousands of lives.

Christmas Seals fight tuberculosis year-round—through education, case finding, patient rehabilitation, and research.

Make Christmas Seals a part of *your* holiday giving, today.

Buy and use Christmas Seals

Copyrighted material

NEW WHEELED TRAILER JACK SAVES YOUR ACHING BACK!

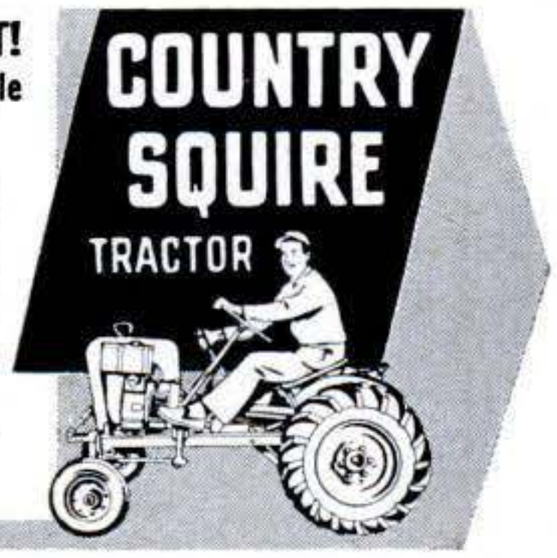
Solid steel threaded shaft. Fits any trailer. Handle folds, wheel removes for road travel. Only $16.96 postpaid. We make trailer axle assemblies, couplers and jacks. Find out about 'em today!

HAMMER BLOW TOOL COMPANY
WAUSAU 14-L, WIS.

POWERFUL! LOW COST!
Light • Rugged • Maneuverable

America's best tractor value. More useable power -- pulling, pushing, driving. 770 lbs. Pulls 12" plow. Gear Drive 8.4 Hp. B&S engine. Roller Bearings. B&W 4 speed Trans. Clutch, Diff. Full line implements. 100% satisfaction guaranteed.

Write for FREE CATALOG
COUNTRY SQUIRE TRACTOR CO.
P. O. Box 107-A-12
Muskego Wisconsin

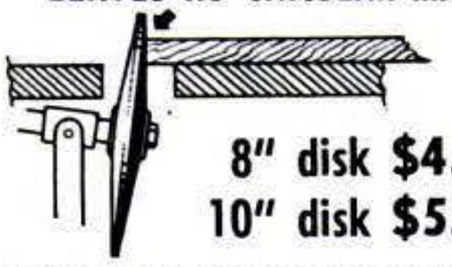


UNIQUE CONICAL SANDING DISK

HANDY SANDY
Patent Pending

Does perfect jointing—ideal for difficult jobs. No sandpaper waste—applies evenly to both sides. Finishes wood or plastics. Takes substantial cuts without damaging sandpaper. For tilting arbor or table saws. Aluminum alloy, precision-machined and balanced. Money back guarantee.

SANDS BEVELS AND SQUARES—LEAVES NO CIRCULAR MARKS



8" disk $4.95
10" disk $5.95

State arbor size when ordering. PREPAID—with sandpaper on disk.

Bell Enterprises, Dept. A, 9405-45th Ave. N. E., Seattle 15, Wash.

---

80 PC. ACCESSORY KIT

For Electric Drills, Grinders and Flexible Shafts.

An 80 piece set of govt. surplus in sturdy plastic container consisting of: rubber wheels, mandrels, mounted stones, mounted cartridges, mounted wire wheel, mounted felt, mounted saw, burs, large mounted cut off discs, etc. For grinding, polishing, sawing, engraving, deburring, rust removal, honing, sanding and hundreds of other uses. 3/32 shank. A $9.00 value. OUR PRICE..... **$3.98** plus 25c for PP

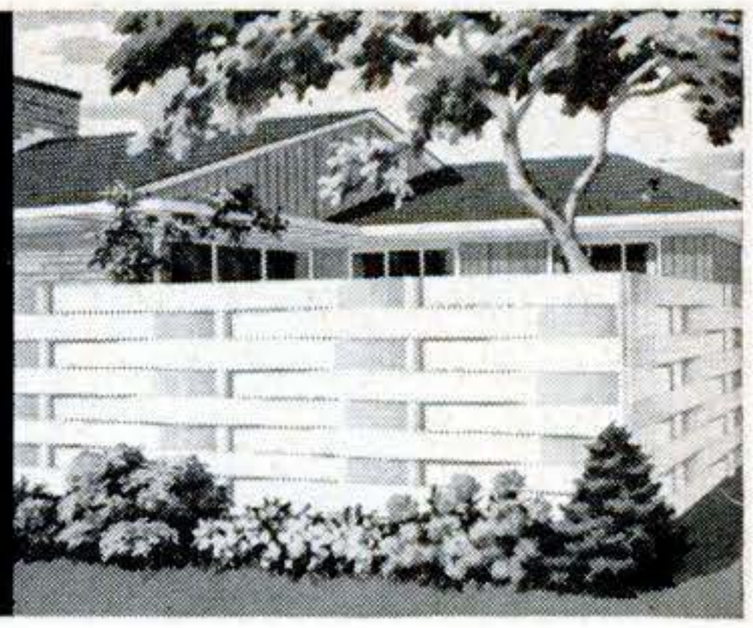
GOVT. SURPLUS

60 PC. DRILL SET

Made by CLEVELAND TWIST DRILL CO. Army surplus in original packing never used. Wire gage sizes No's. 1-60. Made of the finest carbon steel to army specifications by one of the largest drill manufacturers in the U.S. Full jobbers lengths, precision ground and will easily cut through wood, plaster, steel, aluminum, and other metals. Supply limited. **Reg. price $14.95. Money back if not delighted.** Add 40c for PP & Handling. Our low price..... **$5.95**

MATTHEW DAY CO., INC., DEPT. 843, DUMONT, N. J.

Basket-Weave Fencing

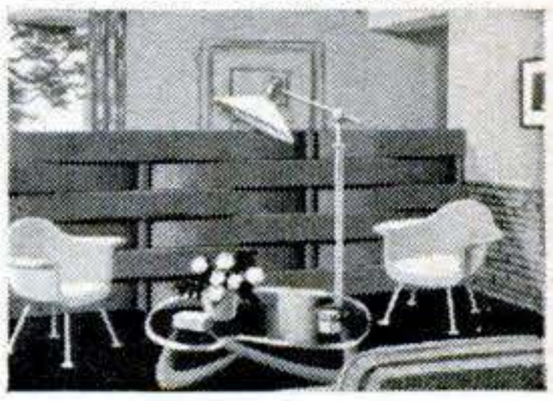


—for outdoor or indoor use
—quick and easy to build
—longer lasting

Build it with Homasote—the oldest, strongest, weatherproof, insulating-building board on the market. Homasote can be cut into special Fence Panels measuring 8" x 8'. Simply weave the panels on posts 4' apart. No cracking; saws and nails easier than wood.

Costs less than any other satisfactory material. Smooth, finished; takes any paint or stain you select. *And it is weatherproof;* (for 40 years there have been no storehouses at the Homasote Plant).

Fencing is only one of 100 uses for Homasote. Mail the coupon today for 3 illustrated folders suggesting 18 interesting and practical make-it-at-home projects—from furniture to complete rooms, ceiling and floor treatments, lily pools.



MAKE IT AT HOME – WITH HOMASOTE

HOMASOTE COMPANY
Department M-6, Trenton 3, N. J.
I enclose 10¢ for 3 Make-It-At-Home Folders

NAME.....
ADDRESS.....
CITY.....ZONE.....STATE.....
My lumber dealer is:.....

---

the original
MODEL NO. 1
by *Forsberg*

WHIZ SAW

7 SAWS IN 1
$55.00
COMPLETE WITH 3 BLADES

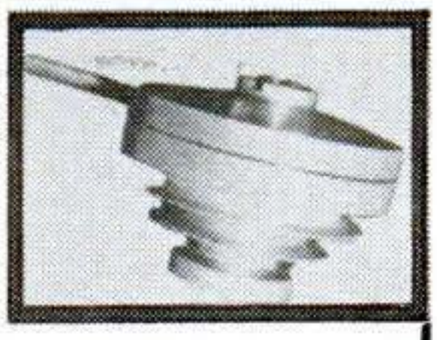
cuts circles, intricate patterns up to 1" thicknesses with ease and speed

Whiz-Saw is the ideal power saw for all sorts of home repairs, plumbing, electrical work, furniture making, cabinet making, hobby projects because it's seven saws in one . . . Rip—Crosscut—Scroll—Coping—Keyhole—Band and Jig Saw. Cuts up to 1" thicknesses—wood, plywood, plywood laminated with Formica or Micarta, pressed wood, bone and hard rubber. Inside cuts without boring a blade hole. **Whiz-Saw** guides easily with one hand . . . safe to operate . . . ruggedly constructed for long life. **If not available at your dealer's—mail the coupon today.**

The Forsberg Mfg. Co.—Dept. PS
125 Seaview Ave., Bridgeport 1, Conn., U.S.A.
Gentlemen:
☐ Please send me free literature on the Whiz-Saw #1 and accessories.
☐ Please send me information on the more powerful Whiz-Saw #2.
NAME _____
ADDRESS _____
CITY _____ ZONE _____
STATE _____

Copyrighted material

New "PULL-GEAR" SPEED-REDUCING PULLEY



Provides Correct Speed and Power to Drill Up to 1 3/8" with 1/2 H.P. Motor

Amazing new internally geared speed reducer doubles drill press capacity. Greater power, greater efficiency, greater productivity.

Provides the correct speed and power for larger drilling, reaming, tapping and boring on light presses. Easily installed in five minutes. Adaptable to all type machines. Spindle speed range approx. 45 to 3000 RPM. Made in 3 motor shaft sizes: 1/2"—5/8"—3/4". Write for literature.

WRITE FOR LITERATURE

THE PULL-GEAR CO.
25429 Mound Road
Center Line, Michigan

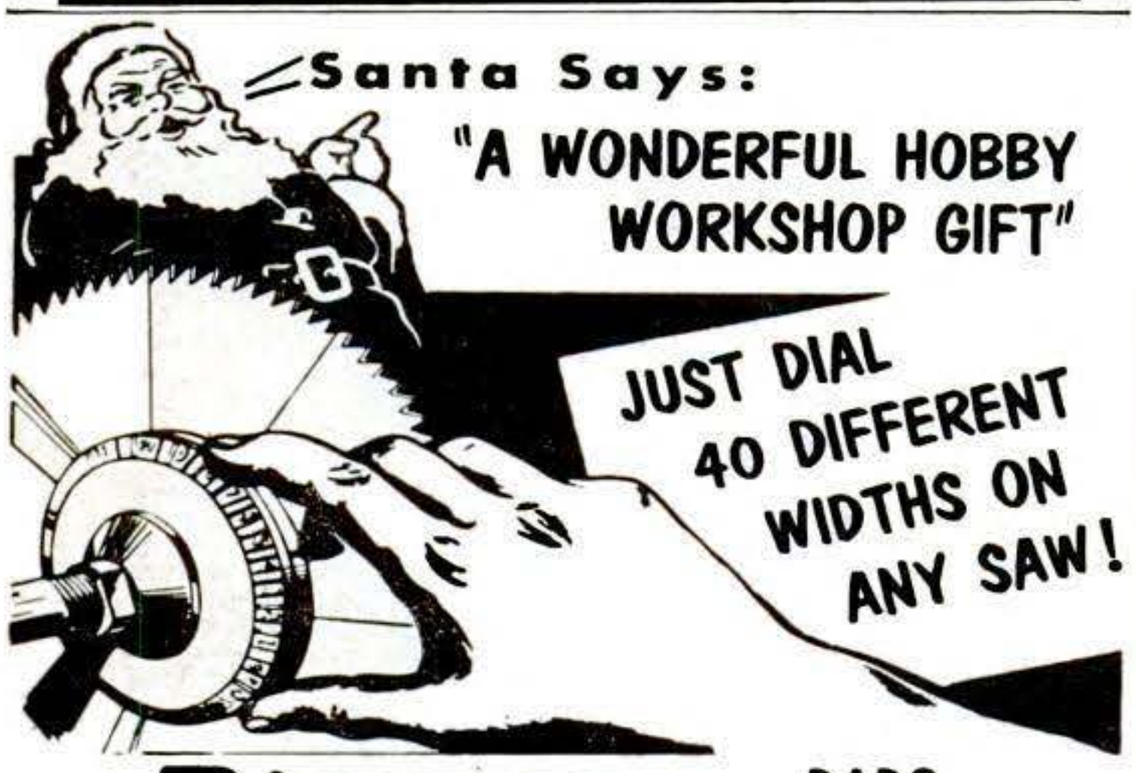
FREE CATALOG of TV KITS

LEARN TV the practical way..

Assemble a TRANSVISION TV KIT in easy stages. **Pay as you wire**—only $15 for Starting Package #1. Learn while building a superb **17" to 27" screen TV Set** with latest features. Ideal for **Fringe Areas**, adaptable to **UHF**. **Easy** — no instruments or technical knowledge required. **Free Catalog** describes 8 great TRANSVISION TV KITS.

Write today to Educational Dept. at:—

TRANSVISION, INC., Dept. PS, **NEW ROCHELLE, N. Y.**



WITH Warren DADO SAWING WASHERS

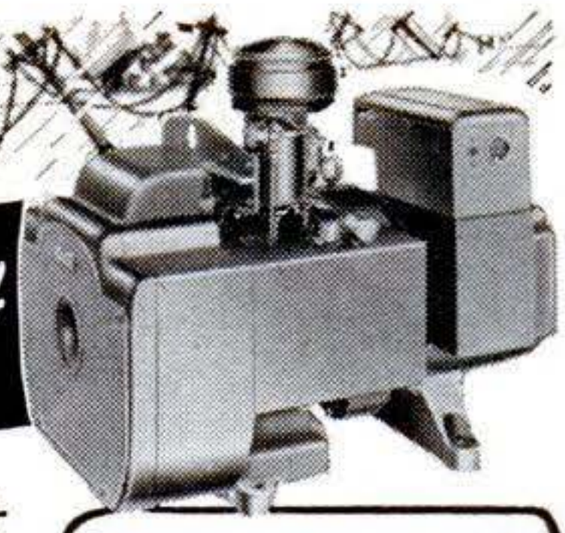
Cut 40 smooth, accurate, parallel grooves – any angle, with your present saw blade. Dial desired width with Micromatic adjustment. Leave on saw for straight cuts. Sizes to fit your arbor – 1/2", 5/8", 3/4", 1". A perfect gift for woodworkers. See your dealer or write!

ONLY $4.95 PER SET

SEND FOR FREE BOOKLET

WARREN WASHERS COMPANY
DEPT. 52 • BOX 98 • NORTH END STATION • DETROIT, MICH.

Protect your home against power interruptions with an...



ONAN *Emergency* ELECTRIC PLANT

Provides dependable standby electricity for heating system, pumps, freezer, lights, appliances. Keeps home safe, livable. Automatic start and stop. *Find out how little it costs!*

Write for Folder!

A SIZE FOR EVERY NEED
400 to 75,000 watts. Compact, quiet-running, easy to install. Gasoline engine powered.

D. W. ONAN & SONS, INC.
3341 University Ave. S. E., Minneapolis 14, Minnesota

SENSATIONAL NEW HIGH SPEED DRILLMASTER

NOW turns the ordinary shop drill into HIGH SPEED DRILL PRESS at a big saving. When DRILLMASTER is used on a 5,000 rpm drill press its top speed will be 20,000 rpm. Does the work of expensive high speed drill presses on brass, aluminum, plastics and cast iron where high speed drilling is necessary. Available for work of any size runs. Fits any 1/2" chuck, holding drills from 5/32 to #80. Shafts are heat treated and ground. Ball bearings and oil impregnated bearings and gear train are housed in cast aluminum. Precision made throughout. MAIL ORDER TODAY only..... **$62.50** Fob. Chgo.

ON C.O.D. ORDERS WE REQUIRE A 10% DEPOSIT. Wt. 2#

DIRZIUS MACHINE SHOP "U", 1423-25 So. 52nd Ave., Cicero 50, Ill.

MAGNETS

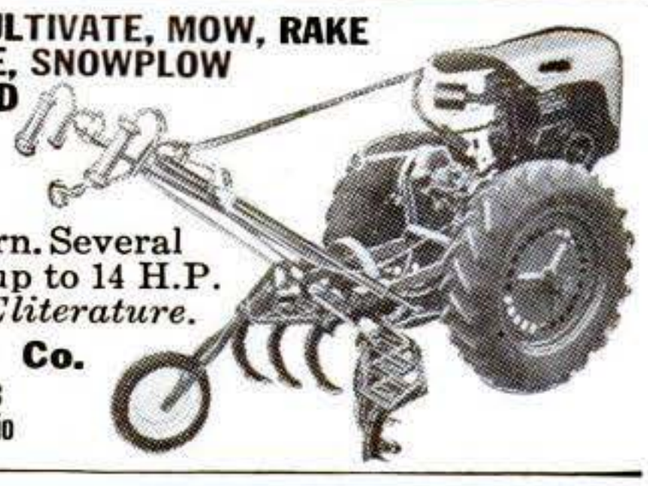
ASSORTED MAGNETS with big list of handy uses.....5 for $1
POWERFUL POCKET MAGNET ideal for testing metals..... $1
RETRIEVING MAGNET pulls tools, etc., from tank or lake..... $4
HOT PAD MAGNETS to insert in your own hot pads.....8 for $1
BULLETIN BOARD MAGNETS to "pin-up" memos, etc.....8 for $1
EXPLORE, LEARN—Electricity, Magnetism, Electro-Magnets. Complete Kit & instructions with 22 experiments and models.....$3.98
Free Catalog. 100% Satisfaction Guaranteed.....POSTPAID

PARK MAGNETS, 6512, 1557 Greenbay Rd., Highland Park, Ill.

SHAW DU-ALL

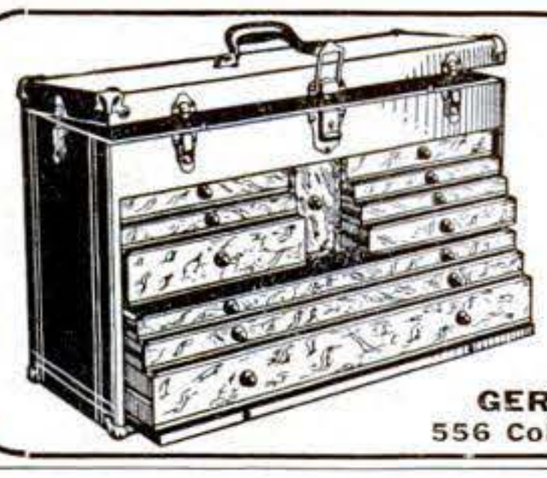
PLOW, CULTIVATE, MOW, RAKE BULLDOZE, SNOWPLOW SAW WOOD

TRACTORS



Just steer it with power turn. Several walking & riding models up to 14 H.P. Low price! *Write for FREE literature.*

SHAW Manufacturing Co.
5712 Front St., Galesburg, Kansas
668-PS N. 4th St., Columbus, Ohio



VALUE "PLUS"

Extra value is built into every Gerstner Chest. Ask the men who use them. Free Catalog for toolmakers and machinists.

GERSTNER TOOL CHESTS
556 Columbia St. Dayton 7, Ohio

When Writing to Advertisers Please Mention Popular Science

BUILD, FLY HELICOPTER!

No license required. You, too, can build and fly the **GYRO-GLIDER**, world-famous helicopter glider. Simple Plans and Kits available now. Order Three-View drawings and specs for **$1.00** TODAY.

BENSEN AIRCRAFT CORP., Dept. PS-12
P. O. Box 2621, Raleigh, N. C.

SEND $1

Name..... Address.....
City..... State.....

Greatest Thrill in Flying

Copyrighted material

READY CUT HOMES

$2150 AND UP DIRECT FROM MILL

YOU SAVE the items which help make today's building cost expensive: high labor cost, contractor's profit and overhead, insurance, architect's fees. Cut-to-Fit eliminates usual lumber and material waste, also costly mistakes. Anyone can assemble. Simple, easy-to-follow plans furnished and each part numbered. Complete with all lumber, roofing, nails, glass, hardware, paint, doors, windows. Freight paid. Low-cost building plans sold separately if desired. 57 Homes and Floor Plans.

5 EASY PAY PLANS
COLOR CATALOG

Send 25c

INTERNATIONAL MILL & TIMBER CO.
Dept. PS-125 Bay City, Mich.

Wholesale! TOOLS! GUNS! CAMERAS!

BUY TOOLS PHOTO EQUIPMENT, SPORTING GOODS, JEWELRY AND THOUSANDS OTHER NATIONALLY ADVERTISED PRODUCTS AT BIG DISCOUNTS SAVE ON OWN PURCHASES BIG PROFITS SELLING TO OTHERS.
POSTCARD BRINGS FREE COPY "THE WHOLESALE PLAN"

Get up to 40% off

AMERICAN BUYERS SERVICE
HERTEL STATION, DEPT. 8, BUFFALO 16, NEW YORK

ELECTRIC WELDER

AC or DC 110 Volt

The "Little Marvel" all-metal welder. 5-year written guarantee. Welds 1/8" metal or money back. Repairs tanks, tools, fenders, machine parts, etc. Complete with everything—rods, unit, eye shield, directions. $6.95 plus 50c postage. Flame torch accessory for soldering, cutting, brazing $3.95 complete with carbons, brass rods, flux. $2.00 deposit on C.O.D. 75 Ampere 1/4 inch Transformer Welder $21.95 F.O.B.

$6.95 Complete

ESSAY MFG. CO., Dept. 47, Quincy 69, Mass.

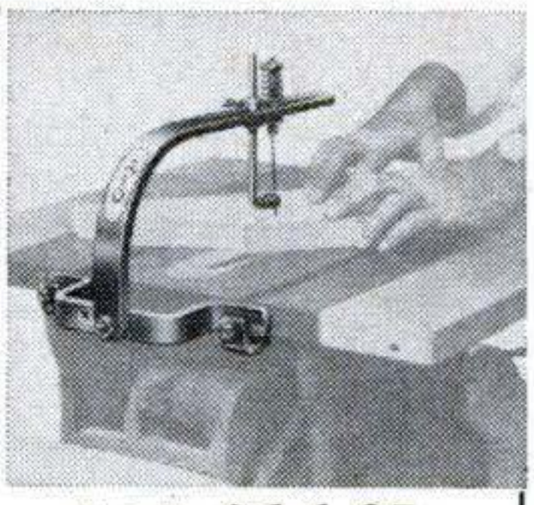
CUT RADIO CHASSIS HOLES IN 1-1/2 MINUTES OR LESS

Quickly make accurate round, square, key, or "D" openings . . . in metal, bakelite or hard rubber . . . with GREENLEE Radio Chassis Punches. Simply turn with a wrench. Many sizes. Write for details. Greenlee Tool Co., 2132 Columbia Avenue, Rockford, Illinois.

TOOLS FOR CRAFTSMEN
GREENLEE

CONVERT YOUR TABLE SAW TO A JIG SAW IN 3 MINUTES WITH

CIRCLE JIG



This is not a toy. It uses standard saw blades. Cuts 2¾" thick stock—cuts to center of 16" to 24" board. Easy to install on any 1/2" or 5/8" table saw without machining, drilling or tapping—simply clamp on with ordinary wrench. Add a jig saw to your shop at this small cost.

Retail Price **$11.95**
SLIGHTLY HIGHER ON WEST COAST
See your dealer or send $11.95 to

VERSA TOOL MFG. CO. INC.
401 Lake Ave. Dept. S Racine, Wis.

"YULETIME IS PORTABLE TOOL TIME"

For the "FINISHING TOUCH" give this new

FAIRCHILD FINISHING KIT

Fairchild's Dualine Sander is the only sander with Orbital and Strate line motion. Just what you need for doing a *professional finishing job with a real factory finish.*

Big! New! Complete 37-pc. KIT!

All the things you need to finish or re-finish *wood* or *metal.* Zip-Strip varnish remover, famous Beacon Wax; wonder-working aluminum oxide and garnet sandpapers; felt pad, waxing pad and lambswool polishing pad. **$49.95**

at Your Dealer, Or Write Direct Giving Favorite Retailer's Name

ELECTRICAL PRODUCTS DIVISION
FAIRCHILD
CAMERA & INSTRUMENT CORP.
BURLINGTON 1, VERMONT

A perfect paint job with half the trouble. Get your money's worth. Paint shaken on a Red Devil Paint Conditioner is ready to use right out of the can. Paint is perfectly mixed factory-fresh — needs no stirring. Ask your dealer to mix your paint on a

Red Devil PAINT CONDITIONER

FREE

How to Prepare Surfaces for Finishing. Illustrated instructions on preparing masonry, wood and metal surfaces for painting.

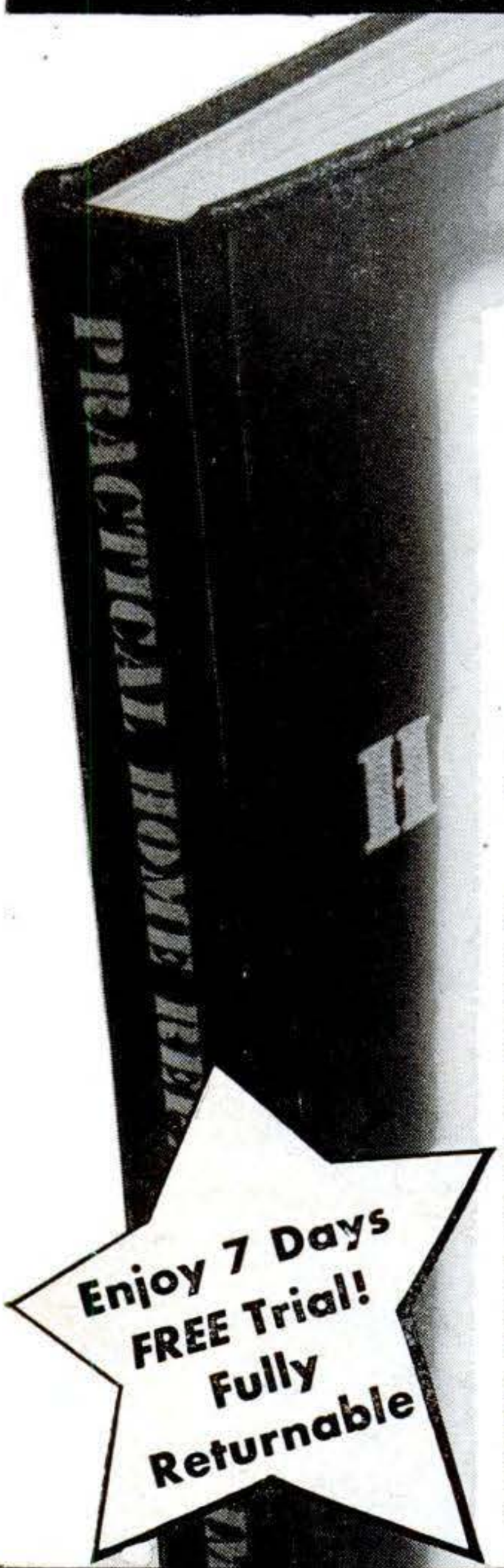
Red Devil Tools. Dept. 131
130 Coit Street, Irvington, N. J.
Please send FREE copy of "HOW TO PREPARE SURFACES FOR FINISHING."

NAME_____
ADDRESS_____
CITY_____ ZONE_____ STATE_____

1662

Copyrighted material

1,001 Jobs Around The House *Made Easy!*



Enjoy 7 Days FREE Trial! Fully Returnable

Dress Up Your Home From Cellar to Attic — Save Hundreds of Dollars on Repairs and Improvements with Aid of Great New Book!

Here at last is a simple, straightforward "show-how" book that makes it a cinch for any man to keep his home shipshape — making necessary repairs and valuable improvements himself.

Whether you own your home or live in an apartment, whether you want to fix a leak or add a whole new wing, here are all the basic "how-to" instructions—complete with over 850 pictures and diagrams.

Nothing gives a man greater satisfaction or pride than enhancing the looks and value of his home by his own handiwork! And now with the help of PRACTICAL HOME REPAIRS AND IMPROVEMENTS, you not only save the labor costs that are the lion's share of any home repair or improvement, but frequently the job you can do yourself is actually superior to that of a hired workman!

You Need No Special Tools or Skill!

Just imagine, with the easy "show-how" help of this amazing book you can yourself re-shingle roofs . . . correct sagging floors . . . repaint your house . . . wallpaper rooms . . . asphalt-tile basement . . . lay linoleum in kitchen . . . overhaul furnace . . . expand attic . . . remodel and modernize with glass brick, plastics, etc., and make lots more wonderful improvements — *all at big cash savings!* You can delight your wife refinishing floors, installing indirect lighting, streamlining kitchen and more! Even that's not all . . . book includes important feature on U.S.-approved homeowner's basic tool set that enables you to do any job from patching concrete walk to fixing roof . . . how to take care of tools you now own . . . a priceless 7-page appraiser's checklist on what to look for when buying a home . . . and ever so much MORE!

SEND NO MONEY NOW! Simply detach and mail coupon below and receive this terrific 256-page volume on FREE trial!

SAVE $300.00 a year and more waterproofing basement, repairing window sashes, overhauling heating system and doing scores of other necessary jobs.

SAVE UP TO $25.00 converting attic into cozy room. Book makes it easy to lay floor, insulate, plaster, finish, etc.

Supply Limited — Mail Coupon Today!

Popular Science Pub. Co., Dept. 1255
353 Fourth Avenue, N. Y. 10, N. Y.

Please send me FREE Trial copy of "PRACTICAL HOME REPAIRS AND IMPROVEMENTS." On arrival, I'll deposit only $2.49 plus postage with postman. If not more than delighted, I may return book within 7 days for prompt refund. #159Z

☐ Send me De Luxe Edition only 50c more. #7052

NAME .....

ADDRESS .....

CITY ..... ZONE.... STATE.....

☐ *Check here if you remit now. We pay postage. Same refund guarantee.*

SAVE $20.00 a room tiling your own rooms with linoleum, rubber, plastic tile. Improve basement with smart asphalt tile.

SAVE UP TO $10.00 an hour making your own roof repairs, fixing leaks, re-shingling, coating gutters, sealing flashings.

Copyrighted material

INTERNATIONAL DRILL•SAW

HI-SPEED COPE-SAW DRILL BIT

NEW LOW PRICE

Ideal as Christmas Gift

REAM • CUT

$2.95 POST PAID

3 for $8.50

DRILL, SAW, REAM...metal, pipe, wood, plastic, Transite, etc. Use with electric drill, slow drill press, lathe, milling machine. Drills own starting hole, upper part of bit is used to cut, saw, ream circles, ovals, squares, scrolls. Easy to use. Ideal for carpenters, mechanics, electricians, plumbers, hobbyists, etc. Abrasive resistant, high speed steel. Flutes ground from solid. Withstands severe continuous use without breaking. Resharpened free. Takes place of up to $50.00 in tools. 1" diameter, 2" cutting sections, total length 3½". Three types—All purpose, Wood, Heavy Metal. Specify type needed. Set of three $8.50. Details on request. Shipped same day. Money-back guarantee. Dealer inquiries invited. *Order Now. Send Cash, Check or Money Order to*

INTERNATIONAL TWIST DRILL CORP. **618 Wyandotte, Rm. 697 Kansas City 6, Mo.**

SHEET METAL BRAKES

Forms angles, locks, pans, etc. New eccentric clamps. All steel construction. Size 15"–16 gauge steel, $23.50; 36" – 22 ga., $35.50; 48" – 24 ga. $52.00. Floor Stand, $8.00.

SHEARS
Foot Squaring Shear, 30"–24 ga., **$115.00**
Hand Squaring Shear, 36"–24 ga., **$80.00**
Angle Shear, 3 Adj. Gauges 7"–16 ga. **$16.50**

ORDER DIRECT OR SEND FOR CATALOG

VYKE MFG. CO., 4154 Jason St., Denver 11, Colo.

BOAT KITS

18 FT. CRUISER

ONLY **$495** Freight included **FREE FOLDER**

12 Models as low as $39.95 (freight included). Fiberglass boat covering kits, marine supplies, etc. Free folders.

TAFT MARINE WOODCRAFT

Dept. PS-12, 636-39th Ave. N.E., Minneapolis 21, Minn.

Also Eshelman 2 Pass. SPORT CARS 1/5 the Cost of Any other Auto. 70 Miles Per Gal. Free Literature.

ESHELMAN CAR SNOW PLOW

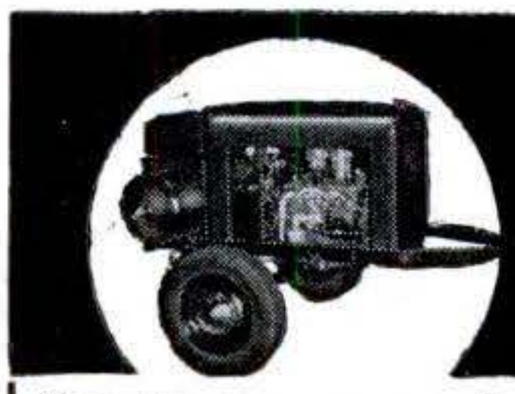
CLEARS ROADS & DRIVEWAYS

$39.95 COMPLETE

Bolts on to car or truck in 2 minutes without tools. Clears snow 16" deep and 72" wide. Lightweight and sturdy. Order now, or write for free catalog.

ESHELMAN, Dept. SP-412
109 Light St., Baltimore 2, Md.

SHIPPING POINTS: Balto., Chicago, Reno



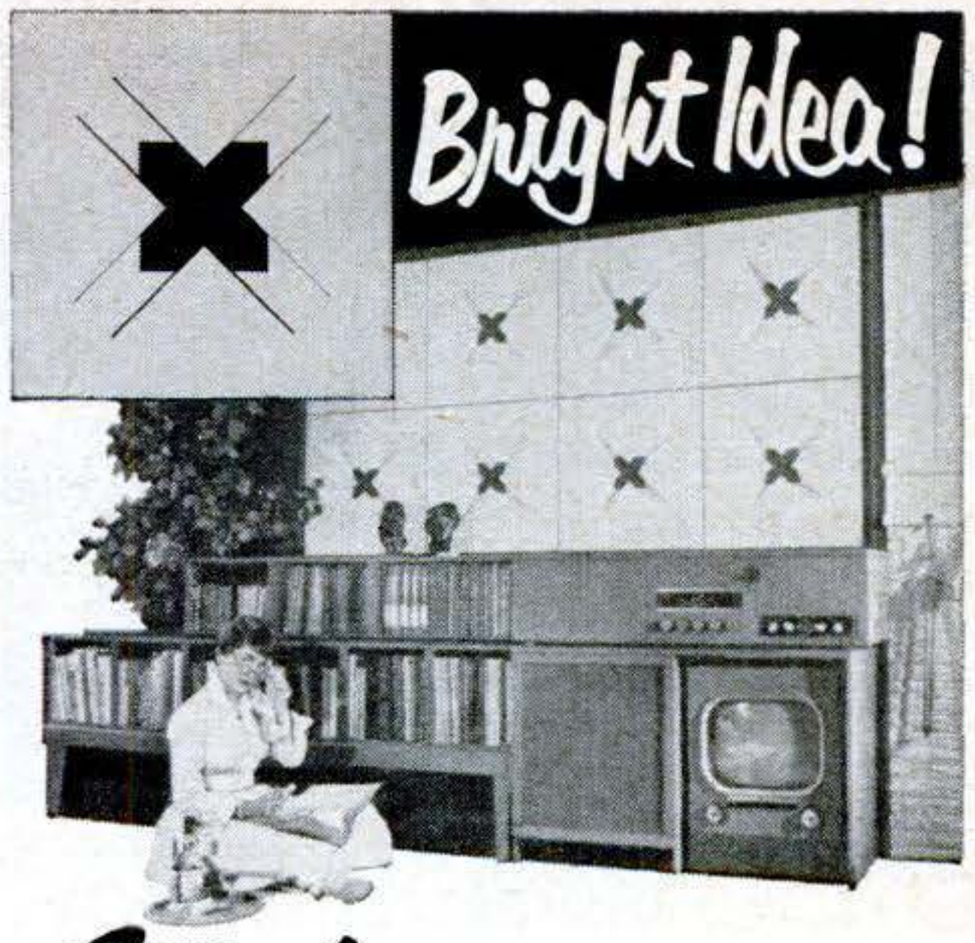
BUILD

your own SMITH *AIR COMPRESSOR*

Operates spray guns, rock drills, tampers, paving breakers, sandblasting . . . Uses only 1 gallon of gas an hour! Save Money—build your own Smith Air Compressor! Famous the world over! Cap. 60 cu. ft.; pressure up to 100 lbs. per sq. inch. Just order the Smith Compressor Head and Accessories with complete instructions for assembling. All you need is a Ford Motor and shop facilities. Head equipped with high speed compressor valves; automatic unloading and idling.

Write for complete information!

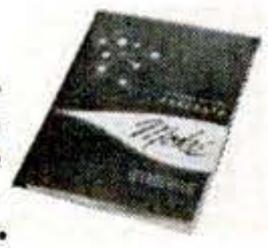
GORDON SMITH & COMPANY, Inc.
405 College Street • Bowling Green, Ky.



Moki® *with* FIR PLYWOOD

(RHYMES WITH O.K.)

Exciting new way of decorating with fir plywood. Create bold, colorful designs by "weaving" slits in plywood with dowels or other inserts. Use for dramatic lighting effects, room dividers, fences, doors. Wonderful for remodeling, "do-it-yourself."



FREE BOOKLET—contains step-by-step instructions, ideas, design suggestions. See your lumber dealer or write (USA Only) Douglas Fir Plywood Association, Dept 1112 Tacoma 2, Wash.

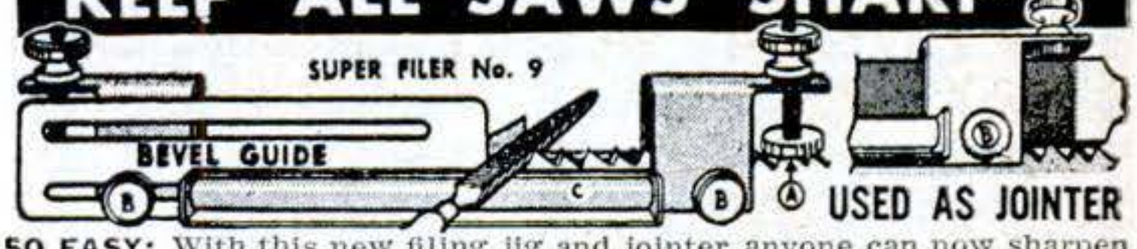
NEW! Giant AUTOMOTIVE CATALOG

1956 Edition! Everything for car, truck, custom-styled car, hot rod . . . at LOWEST PRICES!

Save up to 50% on all parts, accessories! Only complete automotive buying guide...50,000 items ...164 pages! Thousands of **hard-to-find parts;** equipment, parts for 1920 to 1956 models; **Hollywood accessories** never before offered; **hi-speed parts.** Send your name and address and 25c (refundable with first $5.00 order) to:

J. C. Whitney & Co., 1917 Archer, Dept. T-12, Chicago 16, Ill.

KEEP ALL SAWS SHARP



SO EASY: With this new filing jig and jointer anyone can now sharpen any handsaw like new! When file hits hardened steel rollers teeth are finished and EXACTLY SAME HEIGHT. All teeth cut and saw runs true and smooth. Jig and instructions **$2.95** postpaid. Free literature.

SAVE TIME AND $$$

Guaranteed

JOINT & SHARPEN CIRCULAR SAWS

Sensational New Super Filer No. 11 joints and sharpens both **hand** and **circular** saws 6" to 10" with all teeth the correct height, depth, pitch and bevel. Easy to use—when file hits hardened steel roller, teeth are finished. Saw runs true and smooth with no side pull. Complete with special 8" file **$9.95 ppd.** **"TRU-CIRCLE"** saw set automatically sets teeth at 10° or more **$2.95.**

SUPER DRILL GRINDER

Sharpens round shank drills from 3/32" to ½" in diameter, up to 6" long. Grinds old drills like new in 4 different point angles, using hand or power grinding wheels $2.95

SUPER SAW FILER NO. 6

Automatically controls

DEPTH ANGLE PITCH

Automatic DEPTH CONTROL Rollers

IT'S NEW

Perfect bevel and angle maintained, and fool-proof depth control for all Rip, Crosscut and Handsaws. Precision made and calibrated for instant setting at desired angle. Can be used in any vise or clamp. Complete with file, only $6.50PPD.

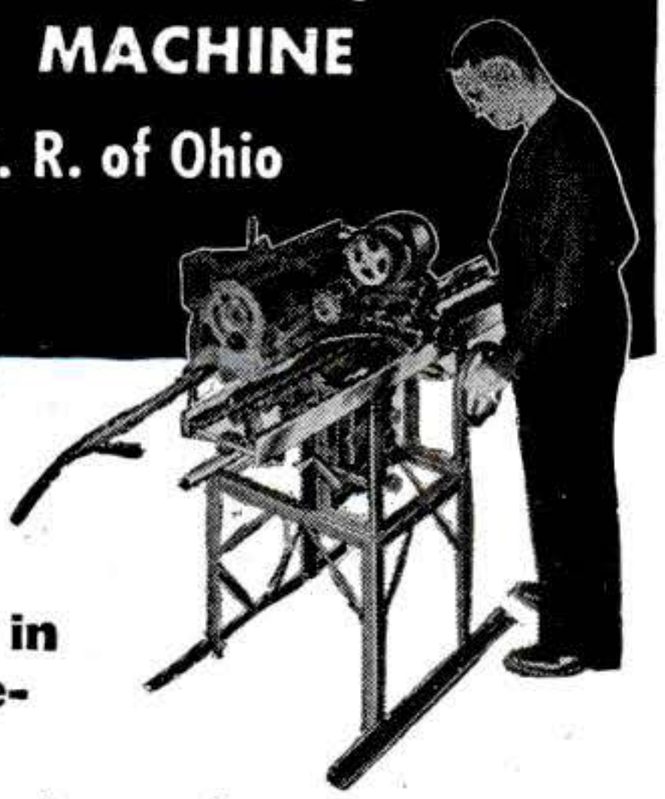
SEND FOR FREE CATALOG

A. D. McBURNEY, 5908 Hollywood Blvd., Hollywood 28, Cal., Dept. S-125

Copyrighted material

THIS INEXPENSIVE EASY-TO-OPERATE MACHINE

Brought Mr. C. H. R. of Ohio $3,688.20 in one season



You, too, can be your own boss in this fine business. Spare or full time, earning big money in your garage or basement.

Yes, C. H. R. is only one of many who write about their success with the Universal Lawn Mower Grinder. Another says, "I am buying a home and my Universal is going to be a tremendous help paying for it." Whether you are buying or want to buy a home, want the security of a sound future or living comforts extra money brings, you owe it to yourself to send the coupon today. Investigate our success plan now—get everything you need to develop a good profitable business of your own.

ROGERS MFG. CO., DEPT. P-125, LINDSEY, OHIO

Fill in and mail this coupon now

Rogers Mfg. Company
Dept. P-125, Lindsey, Ohio

Gentlemen: Please rush me details about the profit possibilities of the Universal Lawn Mower Grinder.

NAME.....

ADDRESS.....

CITY..... STATE.....

ROGERS MANUFACTURING COMPANY LINDSEY, OHIO

BARRON *Drill Press* TOOLS

ROTARY PLANER

Planes • Rabbets
Tenons • Panels
Routs • Bevels

Only $8.50 COMPLETE

FOR WORKSHOP AND INDUSTRIAL USES...

● Over 40 precision built woodworking tools and accessories . . . Hi-Speed Router Bits—Rotary Surface Sanders & Drum Sanders—Safety Shaper Cutters—Dovetail Cutters—Large Auxiliary Metal Tables—All Metal Shaper Fences — Spindle Adapters — Handy Bench Vises. Many other items indispensable for accurate, useful, versatile workshop use. Every tool sold on complete satisfaction or your money back. See your Barron Dealer. Ask for special folder — "24 Extra Uses for Your Drill Press."

FREE Workshop Guide & Catalog

BARRON TOOL CO. INC.
302 Architects Bldg., Detroit 1, Mich.

24-Page Illustrated DO-IT-YOURSELF PROJECTS BOOK

Describes attic finishing, built-in cabinets, add-a-room, recreation room, kitchen remodeling, summer cottage and farm projects. Helpful information on how to get started, planning, cost estimating, materials purchasing, proper procedures, nail charts, moulding designs, etc. Send 25c and also receive 52-PAGE POWER TOOL CATALOG.

BOICE-CRANE CO., 944 Central — Toledo 6, Ohio

JEEP OWNERS

STA. WAGONS • JEEPSTERS • PICK-UPS!

Take full advantage of 4-wheel drive by installing a Ford V-8 engine —MORE POWER—means less shifting, better traction at lower speeds, greater safety, plenty of power in high. All this is now possible by using our F-J adapter plate. Conversion Kit $43.25 incl. FED. TAX. Write for free details or send check or M.O. for prepaid delivery. Order now for early shipment. Please indicate year of engine you will use and whether 2 or 4 wheel-drive.

HOOSIER MACHINE PRODUCTS CO.
314 S.E. 6th St. Pendleton, Oregon

TOOLS WHOLESALE

MAKE EXTRA MONEY

Start your own business. Sell tools to your friends, neighbors, for industrial & institutional use.

A MILLION DOLLAR INVENTORY AT YOUR FINGERTIPS. NO STOCK TO CARRY, ORDER AS YOU NEED IT.

Send $1. deposit for dealer's card and get the giant new 1955 wholesale catalog at no extra charge. $1. is credited to your first purchase or refunded if you are not 100% satisfied.

● Stanley, Millers Falls, Plumb, Disston, Wiss, and hundreds of other nationally advertised name brand tools, appliances, motors, elec. tools, power tools and others too numerous to mention.

WHOLESALE DISCOUNTS Up to 50% off

SILVO HARDWARE CO., Dept. PS-12 108 Market St., Phila. 6 Pa.

Paint *STRIPES* with New "*PAINT PEN*"!

Straight, Curved or Parallel Lines

Use like a fountain pen with any color paint to stripe furniture, bikes, autos, model planes, toys, linoleum, wall board. Beautiful clean, crisp results every time. Can't clog or smear. Also use with glue, tempera, textile paint or ceramic under glaze. Paints on wood, glass, plastic, metals, fabrics and paper. Tool complete with tip for 1/16" stripe only $1.25 postpaid. Other complete tools with following tips, 1/64", 1/32", 3/64", 5/64", 3/32", ⅛"—$1.75 each. Extra tips 90c each. Entire kit with tool and 7 tips—$5. A ¼" tip only $1.20 each. C.O.D.'s postage collect.

New! "DOUBLE-STRIPE" 5 Way Combination Model only $3.25
Double Stripes—one wide and one narrow or two wide or two narrow at the same time.

FREE Send postcard for complete information—or ORDER TODAY.

$1.25

DEALERS: Master Paint Striping Tool in display cartons of 1 doz. FAST, PROFITABLE SALES. Write for new discounts.

HOME CRAFTSMEN! New Paint Striping Tool gives "professional" results every time, simple, easy to use. Send $1.25 now.

MANUFACTURERS: Write today for information about industrial models and production striping tools.

WENDELL MFG. CO., Dept. 212
4234 Lincoln Ave., Chicago 18, Ill.

Statement of Ownership, Management, Circulation, etc., required by the Act of Congress of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) of Popular Science Monthly, published monthly at New York, N.Y., for October 1, 1955.

1. The names and addresses of the publisher, editor, managing editors and business manager are: Publisher, Popular Science Publishing Co., Inc., 353 Fourth Avenue, New York 10, N.Y.; Editor, Volta Torrey, 353 Fourth Avenue, New York 10, N.Y., Managing Editor, Howard Allaway, 353 Fourth Avenue, New York 10, N.Y., Business Manager, Godfrey Hammond, 353 Fourth Avenue, New York 10, N.Y.

2. The owners are: Popular Science Publishing Company, Inc., 353 Fourth Avenue, New York 10, N.Y.; Stockholders of Popular Science Publishing Company, Inc.; Mansell and Company, 45 Wall St., New York 5, N.Y.; Noreen S. Capen, Capeswold, Bedford Village, N.Y.; Ada B. Wilson, 683 Springfield Avenue, Summit, N.J.; Marguerite N. Cole, Round Hill Road, Greenwich, Conn.; Irma V. Hammond, Carstensen Rd., Scarsdale, N.Y.; Helen B. Glennon, 65 Prospect Ave., Larchmont, N.Y.; Caroline L. Flynn, 1 Otterock Drive, Greenwich, Conn.

3. The known bondholders, mortgagees and other security holders, owning or holding 1 percent or more of the total amount of bonds, mortgages or other securities are: none.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustees is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

(signed) Godfrey Hammond, Publisher

Sworn to and subscribed before me this 23rd day of September, 1955. Esther Eyl Talbert, Notary Public, State of New York No. 24-9276475. Qualified in Kings County, Certificates filed with: New York and Kings Co. Clks & Register. Commission expires March 30, 1956. (Seal)

Copyrighted material

DRILL • SAW • REAM • CUT
ALL WITH ONE BIT!
BEAVER SPEED SAW DRILL BIT

Beaver's new improved high speed side cutting drill bit can be used on any electric drill, drill press, lathe or milling machine. Made from the finest American high speed steel. 3½" long. 2" side cutting section. ¼" diameter. Designed to cut steel, wood, plastic, aluminum, etc. A versatile time-saving tool for EVERYONE. Money back guarantee! Three types available: All-Purpose, Wood and Heavy Metal—specify type desired. Buy them from your dealer today! Or send cash, check or money order NOW.

SET OF 3 MAKES AN IDEAL GIFT.
Dealer inquiries invited.

BEAVER DRILL & TOOL COMPANY
3008A McGee Trafficway Kansas City 8, Missouri

NEW "WIZARD" TOOL DRILL GRINDING GUIDE

MAKE OLD DRILLS LIKE NEW...

For repointing dull and broken twist drills up to ½" in diameter. One piece cast Aluminum. Simple. Anyone can use it. Order yours to-day. $1.00 postpaid.

BRASS CASTING CO. $1.00 POSTPAID
P. O. Box 3056 Memphis 9, Tenn.

NEW! IMPROVED SUCTION CELLAR DRAINER

CAPACITY 300 GALLONS AN HOUR!

DRAINMASTER takes the curse out of basement flooding problems. Operates on normal city water pressure. Electric power failure is no problem. Made of "life-time" solid brass, no moving parts to wear or adjust. Just connect to a handy faucet with garden hose, turn on faucet and DRAINMASTER is working, flood water is removed *Right Down* to the floor, no sump needed. Many other drain and pumping jobs are "duck-soup" for DRAINMASTER . . . ask for the NEW Flat Bottom Model at your favorite Hardware Store, or add 30c for handling and postage and we'll rush DRAINMASTER to your aid. *Write To:* **$2.25**

M. P. WHITE CO., Dept. 4-PS, 55 Stuart St., Boston 16, Mass.

DITCH-WITCH TRENCHER

Portable DITCH-WITCH digs 4½" or 6" clean, even ditches to 36" depth in all types of soil. Four rugged models. Complete unit — self-propelled. OUTDIGS 8 MEN
Write for Illustrated Literature

The CHARLES MACHINE WORKS
637 B Street Perry, Oklahoma

SURPLUS SALE

$39.50 Less Grinding Wheel

NEW TOOL POST GRINDERS
REGULAR PRICE $125.00
1-6 H. P. MOTOR
TAKES WHEELS UP TO ½" x 4"
EXTRA QUILL EXTERNAL OR INTERNAL $19.50
MONEY BACK GUARANTEE

EDWARD J. NOLAN, PULASKI, NEW YORK

FREE BOAT KIT CATALOG Write:

8′ to 14′ Models from $39.95 incl. freight

- Assemble your own boat
- No experience necessary
- Save ½ to ⅔ "factory built" prices

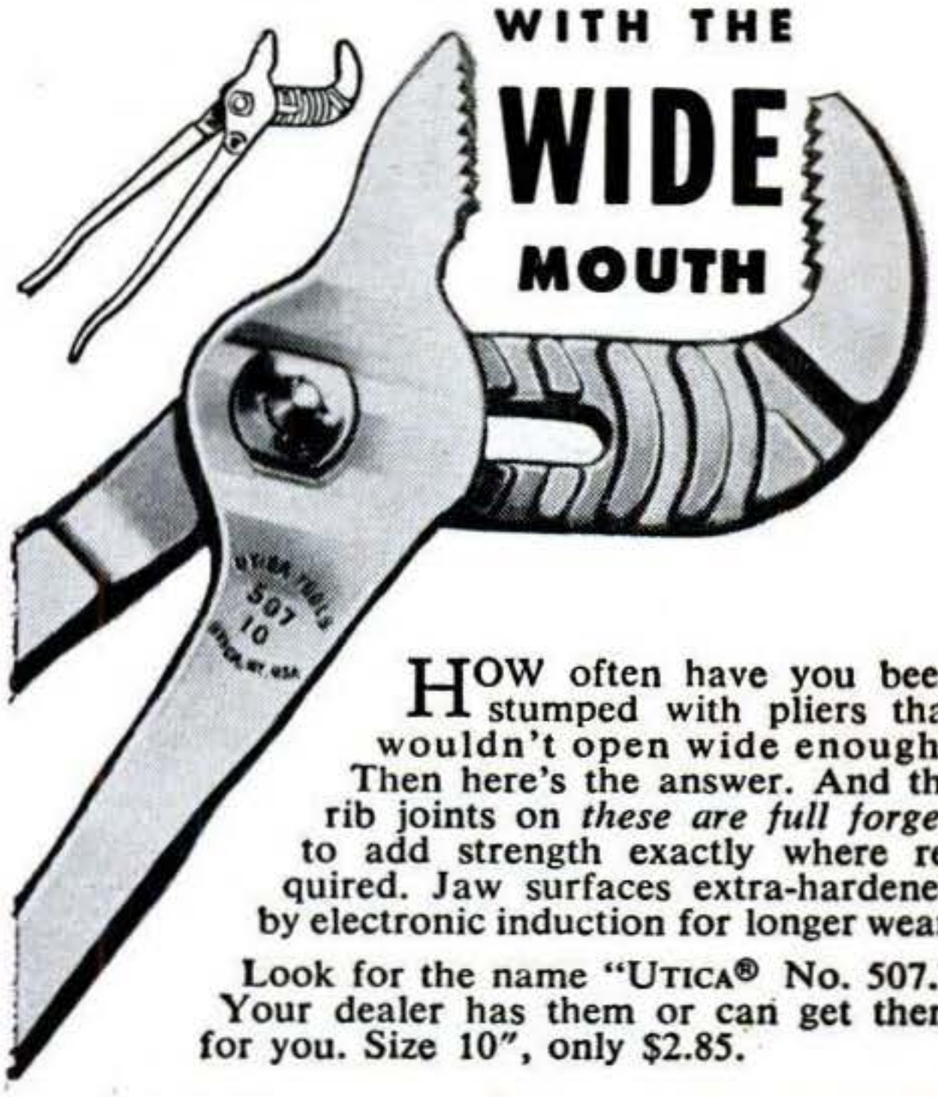
12 ft. Runabout Pictured

Marine Hardware, Trailers, Fiberglas

LUGER INDUSTRIES DEPT. A 4452 NICOLLET AVE. MINNEAPOLIS 9, MINN.

UTICA®

ALLIGATOR PLIERS WITH THE WIDE MOUTH



HOW often have you been stumped with pliers that wouldn't open wide enough? Then here's the answer. And the rib joints on *these are full forged* to add strength exactly where required. Jaw surfaces extra-hardened by electronic induction for longer wear.

Look for the name "UTICA® No. 507." Your dealer has them or can get them for you. Size 10", only $2.85.

UTICA®
DROP FORGE & TOOL CORP.
Utica 4, N. Y.

NEW BENJAMIN SUPER CO_2 GAS CARBINE — $16.50

HI-LO (2 Stage) Jet Power
Cal. .177 or .22
RIFLED
Shoots Pellets & Darts

IDEAL FOR TARGET & SMALL GAME
SAFE — ECONOMICAL — ACCURATE
CONVENIENT — PRACTICAL — NON TOXIC

EASY TO OPERATE—NO PUMPING—NO FLINCHING. Get 40 SHOTS from each 10¢ STANDARD SIZE CO_2 (Soda) CARTRIDGE Up to ¾" penetration. Ask your DEALER for DEMONSTRATION.

New Benjamin .177 or .22 CO_2 ROCKET Gas Pistol with HI-LO JET POWER.....$15.00

FREE Folder

BENJAMIN AIR RIFLE CO.
852 MARION ST., ST. LOUIS 4, MO., U.S.A.

PAINT STAINS WASH RIGHT OFF

when you've used Du Pont PRO-TEK®

Like invisible gloves, Du Pont PRO-TEK hand cream guards your hands against paint, grease, garden soil. Just smooth on PRO-TEK before work, wash it off afterward — and away go sticky stains and grime along with the PRO-TEK! Leaves hands wonderfully clean. Try PRO-TEK today. At drug, hardware, paint and auto supply stores.

DU PONT REG. U.S. PAT. OFF. Better Things for Better Living . . . *through Chemistry*

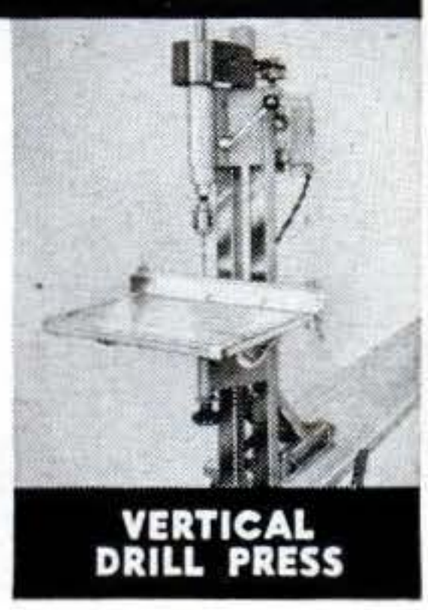
Copyrighted material

SUPERSHOP MAGIC POWER TOOLS

Only $16 each!

5 BIG POWER TOOLS IN ONE
FACTORY TO YOU $79.95

Only SUPERSHOP can offer you a complete precision-built workshop for $16 per tool. 100% Ball Bearing. Lifetime accuracy. Rugged frame of heavy steel tubing. Handles big jobs. 8" saw. Sold direct from factory to save you $65.05. FREE trial. Easy pay plan. Free Catalog.



Write for FREE Catalog

POWER TOOLS INC. 278 YATES AVE. BELOIT, WISCONSIN

STOP SAGGING REARS!

with LOW-COST

AIR LIFT *PNEUMATIC SPRING BOOSTERS*

Car got that "middle age spread" look? Even new cars need help for overloads of luggage, equipment or extra passengers. AIR LIFTS fit between leaf springs and frame — inflate with air to support overloads up to 1000 lbs! Perfect for vacation trips, and so easy to install. See your dealer or write for his name.

Most Models **$20**

FREE! . . . tip-packed literature on Air Lift remedies for sagging rears. Write Dept. 1312.

AIR LIFT

AIR LIFT COMPANY, LANSING, MICHIGAN

½-HP Motor SPEED REDUCER

Reduces Speed at a 20-1 Ratio

Brand New! *Mfr'd. for Army radar equipment, this reducer is*

Guaranteed! *a masterpiece of design and precision workmanship*

For experimental and laboratory uses . . . for building special equipment that saves valuable man hours. Ratio of 20-1 gives approximately 90-RPM with 1750 motor, direct drive . . . or can be belt driven to give ANY DESIRED SPEED! Use with any size motor up to ½-HP. Case is cast of aluminum alloy (not die cast) and has BALL BEARINGS throughout. Heavy duty, double reduction, spur gear drive built for continuous duty. Smooth, quiet running. Base to shaft is 4¾" high. Comes complete with couplings. Operates: conveyors, timing devices, revolving window displays and signs, tumbling equipment and machine tool drives . . . 1,001 uses!

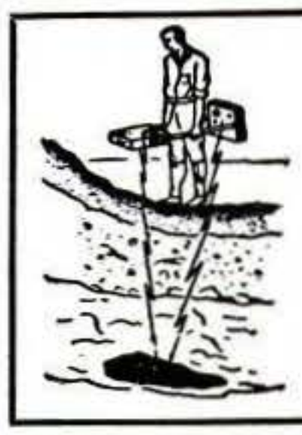
Gov. Cost $86

Only $16.50 Pre-paid

Order From AD! We Pay Shipping!

FREE CATALOG OF OTHER ELECTRICAL BUYS

ROBERTS ELECTRIC CO., Dept. PS-342, 849 W. Grand, Chicago 22, Ill.



Treasure and Mineral LOCATORS GEIGER COUNTERS

Superior performance, lowest price, monthly payment plan. FREE LITERATURE.

FISHER RESEARCH LABORATORY, Inc.
PALO ALTO, CALIF.

ATTENTION HOME OWNERS!

No excuse now for not having a kitchen fan! Complete unit. Polished grill. Automatic fan goes on when door opens!

Don't let price fool you, this is the latest new model! **$14.95**

A wonderful gift for your wife.

Regular price $27.50

Buy direct and save. Parcel post paid if check is included with order.

Medford Mfg. Co., Medford, N. J.

OVERLOAD SPRINGS

$9.95 Per Pair postpaid
2000 LB. SIZE $11.95

For cars and trucks. Front and rear. Gives 2000 lbs. extra capacity for all ½, ¾, and 1 ton trucks; 500 or 1000 lbs. extra for all cars. Easily installed. Guaranteed. State make, model. Dealers wanted.

BRINKMAN MANUFACTURING CO.
2315 Clay Dept. 6-D Topeka, Kansas

MAKE YOUR OWN Modern • COCKTAIL TABLE •

—with **distinctive AIRFORM Metal Legs by Nord-Craft** . . . just attach (with furnished screws) to flat surface for expensive-looking decorator effect. Sturdy steel, black satin finish, brass ferrule. Leg tilts out for smart appearance, added strength. New life for old sofas, chairs, tables, TV, chests. Set of 4 legs prepaid: 6"—$6.95; 9"—$7.45; 12"—$7.95; 16"—$8.95; 20"—$9.45; 22"—$9.95; 28"—$11.95. No C.O.D.'s. Enclose and send check or M.O. today.

NORD-CRAFT INDUSTRIES Dept. J Box 565, Madeira, Ohio

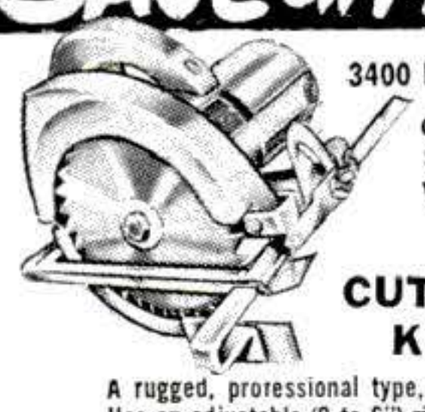
The Modern PLASTIC for lasting Home Repairs

PERMANENTLY mends cracks or holes in wood, tile, stone or plaster. Sticks and stays put—Does not chip, shrink or fall out. Easy to use. Economical. Mold it, chisel it, polish or paint it. The big 4-lb. can is obtainable from your lumber, paint or hardware dealer at $1.25; or will be shipped direct postpaid (in U. S.) for $1.50. Complete satisfaction guaranteed or your money refunded. Order now.

DONALD DURHAM CO.
Box 804-U Des Moines, Iowa

Copyrighted material

SAVE on PALLEY SPECIAL VALUES



3400 RPM ½ HP **POWER SAW**

COMPARES TO SAWS SELLING UP TO $49.50 WITH A 5½" BLADE **ONLY 19.98**

RIPS - CROSSCUTS

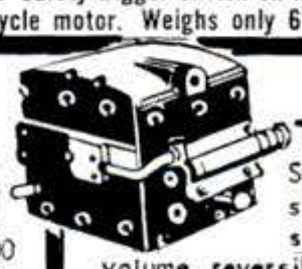
CUTS A FINISHED 2x4 LIKE A KNIFE THROUGH BUTTER

A rugged, proressional type, adjustable saw. Will cut any angle from 0 to 45°. Has an adjustable (0 to 6") rip fence. Safety-trigger switch on handle. Full ½ HP Universal AC-DC, 110-120 Volt, 60 cycle motor. Weighs only 6½ lbs.

PRESSURE TANKS

G1 Type Stainless Steel. Shatterproof and rustless. Has reinforcing ribs and is pressure tested up to 400 PSI. Has high safety factor. 1/4" pipe ports. Ideal for use in air supply in underwater fishing, painting, spraying, etc. Also as buoy or for water supply. Size: 12½" x 24". Stainless Steel. . . **12.95**

Corrosion Resistant Steel TANK - No. D-2. 500 cu. in. capacity. . . . **3.95**



VICKERS HYDRAULIC TRANSMISSION

Self-contained, constant torque at all speeds with variable volume, reversible piston pump which supplies piston hydraulic motor. Has 2 H.P. Automatic pressure dash pot for smooth control. Power output RPM -0 to 1/3 input RPM in both directions. Input RPM 1800 continuous, 4000 intermittent. Ideal for Lathes, Duplicator setup on Mills, Conveyors, Small Cars, Drives, etc. **49.50**

4" SPLINE SHAFTS for input and power take-off on above. Pair $2.50

INPUT & TAKE-OFF PLATE ASSEM. To adapt Trans. to pulley drive. Has 1/2" keyway shaft. High speed bearings. **20.00 SET**

NYLON CORD & ROPE

Finest Quality. Lustrous

1/8" Sheathed Nylon. Colors: White, Green, Yellow, Wine, Brown, Pale Blue. Has a 600 lb. breaking strength. . . 2½¢ run. ft.
5/32" Parachute Cord. Colors: OD & White. Price . . 4-1/2¢ run ft.
1/4" Orlon. Strength 1100lbs. 8¢ run ft.
1/2" Nylon. Strength 2700lbs. 27¢ run ft.
1" Nylon. Strength 18000 lbs 50¢ run ft.

SOUND POWER PHONES

Used by Navy for Gun Control. An ideal emergency communication system because each set is 'sound' powered - no other power needed. Will reach any point-to-point in a radius of 1/2 mile. Each set includes 2 phones on chest plate, 2 headsets, button switches and approx. 35 ft. of wire. PER SET **9.95**

VICKERS VARIABLE DISPLACEMENT HYDRAULIC PUMP

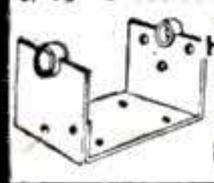
Just Received in stock! Model AA20328. Has a built-in relief valve set at 2225 PSI. Continuous operating pressure is 1850-2000 PSI. The displacement is .600 cu. in. per rev. Swivel type inlet and outlet ports are 7/8" male tube. Cost Government approx. $1500 each **NEW 129.00**

SAVE 50% ON NEW PALLEY HYDRAULIC CYLINDERS

Send Today for latest CATALOG showing our New line of Palley Hydraulic Cylinders. Built by us to meet the most rigid requirements.

$110.00 VALUE **HOIST ONLY 32.50** WITHOUT MOUNT

Excellent for Machine Shop, Garage, Truck, Boat, etc. Has 2500 lb. lift capacity through a 24 to 1 gear ratio. Bronze worm gear drive. 18 ft. of high tensile strength 3/16" steel cable. NEW!



HOIST MOUNTING FRAME Specially designed for mounting the above winch Frame only **4.50**

PORTABLE WINCH HOIST

LIFTS 1500 POUNDS - Made originally as a Bomb Hoist. Has 21 to 1 gear ratio. A 40" tubular arm extension with a 3" pulley. Drum has 12 ft. of 3/16" steel cable. Operating handle has ratchet brake. For 'swing about' loading. $125 VAL. **22.50**

NEW JACK & HEINTZ 2-SPEED ENERGIZER

Used as auxiliary power source to actuate aircraft starters. Has 2-speed control for 200 RPM low or 275 RPM high. Heavy duty gear box gives extremely high torque. Power 110-115V AC. Easy to convert to many power uses. **27.50**

180° OFFSET DRIVE

For use where tremendous power at low take-off RPM is desired. 6 gears rotate on self-lubricating, hi-speed roller bearings. 85 to 1 gear ratio. Shafts are 1¼" & 3/8' dia. All NEW! **12.95 NEW**

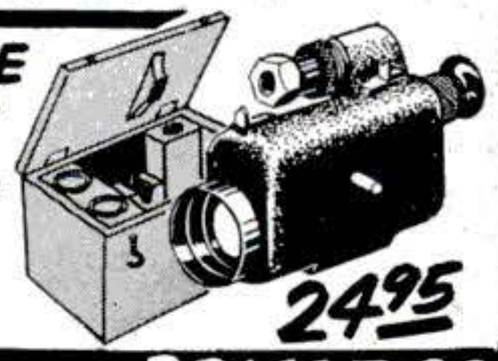
GIVE THE KIDS A THRILL

RADIO RECEIVER

WITH HEADSET ONLY **3.95**

Here's a COMPLETE RADIO RECEIVER that picks up STANDARD BROADCAST STATIONS without using batteries or electricity! Just plug in the headset, antenna and ground wires and tune in your favorite program. You'll be amazed at the STRONG, CLEAR SIGNAL. Has a 100KC tuning range. Comes complete with Receiver, Antenna and Ground wires plus a Headset with two 2000 Ohm ear phones. NOT A TOY - A Genuine Crystal Receiver!

NAVY 6 POWER TELESCOPE



A remarkable Navy Surplus Bargain! Was originally designed as an Azimuth Telescope which mounted above the Gyro Compass. Has approximately 6 POWER MAGNIFICATION. Finest quality, fully coated lenses. Crosshair reticle. Adjustable eyepiece. Spare prism. Two snap-on filters - one for sun the other for haze Complete in wood case. New condition. . **24.95**

HARDWOOD LEGS WITH BRASS TIPS

BUILD OR RESTYLE YOUR OWN FURNITURE

Beautifully turned, fully seasoned hardwood legs. Smoothly sanded and complete with brushed Brass tip and sturdy steel mounting plate. Available Finished or Unfinished - Finished units come in Blonde, Silver Fox. Mahogany or Charcoal Black. Please Specify type.

Price per set of 4 with Brass tip.

SIZE	FINISHED	UNFINISHED	SIZE	FINISHED	UNFINISHED
4"	$2.65	$2.15	14"	$4.40	$3.95
6"	3.00	2.65	16"	4.75	4.40
8"	3.55	3.00	18"	5.35	4.75
12"	3.95	3.55	28"	6.25	5.35

SAVE UP TO 50% BUY FROM IMPORTER

Genuine Select PHILLIPINE MAHOGANY LUAN PLYWOOD

Ideal For Fine CABINET WORK, FURNITURE, Paneling DENS, OFFICES, HOTELS, etc.

Our prices are LESS THAN DOMESTIC PLYWOOD at WHOLESALE. This selected LUAN MAHOGANY meets the most rigid specifications. It is WEATHER and WATER RESISTANT. You'll be amazed at the beauty of this fine wood. Its rich golden elegance will thrill you. Rotary cut for beauty of grain. Both sides sanded and ready to use. Bonded with finest resin adhesive. Face side unjointed.

See for YOURSELF FREE SAMPLE on request!

Available in three thicknesses - 3mm (approx. 1/8") 4mm (approx. 3/16") and 1/4". All orders shipped by Special Truck for lowest rates. No order accepted for less than 100 lbs. - equal to (8) 3mm sheets, (6) 4mm sheets or (4) 1/4" sheets. . . . . .

3 mm (1/8") x 3 ft. x 6 ft.	4 mm x 4 ft. x 8 ft.	1/4" x 4 ft. x 8 ft.
$5.00 VALUE	$7.50 VALUE	$9.50 VALUE
1.79 PER SHEET	3.89 PER SHEET	4.49 PER SHEET
Minimum order 8 sheets	Min. order 6 sheets	Min. order 4 sheets

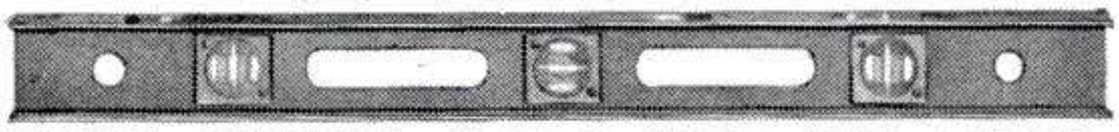
AAF SURVIVAL PONCHO

Complete Rain Protection. Dark Blue outside, gold inside. Extra roomy. May be used as emergency tent or tarpaulin, also makes fine ground cloth. Has hood with tie string at throat. ONLY . . **3.95**

ORDER TODAY - Pay by Money Order or Check. ½ deposit with C.O.D.'s. All prices F.O.B. Los Angeles.

PALLEY SUPPLY CO 2263 E. VERNON AVE., DEPT. PS-12 LOS ANGELES 58, CALIF.

"FEATHER-LIGHT" LEVEL MAGNIFIES!



NEW EMPIRE ACRA-LITE NO. 1521

ONE-THIRD LIGHTER than aluminum, ACRA-LITE Magnesium levels easiest to use. "Full-Vue" magnifying cover plates speed up your accuracy. 2 Plumb—2 Level—2 45° #1521

24" **$6.70**—28" **$7.60**—48" **$13.50.**

At your dealer or write.

EMPIRE LEVEL MFG. CO.

10930 W. Potter Road, Dept. PS Milwaukee 13, Wis.

SURPLUS AIRCRAFT MATERIALS

COMPASS, magnetic, aircraft, type Bendix Mark VIII, 360 glass, 3½" dia., Panel mounting, lighted, Excellent condition, PP, Prepaid **$9.95**

COMPASS, Astro, Mark II, in carrying case. (for navigating by stars, distant objects, triangulation, etc. 9½" X 4½" X 5". PP, Prepaid **$7.95**

CYLINDER, hydraulic, double-acting. 4" stroke X 2" dia., 1¼" shaft. ¼" tube fittings. PP, Prepaid **$3.95**

PUMP & MOTOR, Anti-icing. 24V, three ¼" ports, 1 in, 2 out, 2½ gph. 2½" dia. X 7". wt. 2½ lbs. Runs AC if ground disconnected. PP., Prepaid **$7.95**

BALLOON TIRE, Tube & wheel & bearings. 900X6" size. 22" ht., 7½" wide, 6" wheel. 1½" axle size. 8 ply tire. Wt. app. 30 lbs. FOB. . . . . **$13.95** (four for $49.50)

INSTRUMENT TEST SET, Instrument, portable (3 wheels), type C-1. 110V ac-dc, input. Has air, oil, suction pumps, full instrument panels, accessories. **$149.50** (with master altimeter & thermometer testers, $198.50). Gr. weight, app. 500 lbs.

LYCOMING ENGINES, AAF, type 0-435-1, 190hp, 6 cylinder, flat-opposed, aircooled. Weight app. 330lbs. 45"LX32"WX28"H. Use for air boats—sleighs, etc. Engine, prop. hub, s.plugs, ignition harnesses. 2 magnetos, carburetor, generator, Gross weight varies, 450 to 550 lbs. FOB. good used condition. . **$125.00** up.

AERO PARTS SUPPLY, Dept. 211, 8102 Lockheed St., Houston 17, Texas

Copyrighted material

[Continued from page 260]

Distributor drive shafts snapped. They beefed them up, altered their alloy content and gave them better bearing support. Engine blocks distorted. They strengthened the block reinforcements.

Plugs fouled at low speeds. This was a real poser. They thought the trouble was faulty valving, and even made glass cylinder heads to study it. But the solution was almost simple-silly. It turned out that when the gaps in the rings got aligned, oil from the pan squirted straight into the head. So they put a burr on the oil ring to catch in the drain hole of the groove. That kept the ring from rotating.

The real problem, with increasing compression, was valves. It still is, for everybody in the business. Olds had to go to silicon-chrome intake valves for '56 to withstand the heat. Exhaust valves are made of a nickel alloy.

Moreover, valves can't be run too dry. They wear. The stems deform. The stems must have an oil-vapor bath. Yet valves have to be sealed well, else oil runs down the stems into the cylinders.

Today, like everybody else in the automobile-manufacturing business, Oldsmobile has higher compression, higher torque, higher horsepower and better performance. If you ask the company why it has done all this at the expense of throbbing headaches, you will be told that it's on account of competition, mostly.

The record is an affidavit. The Olds people were content with the original 135 horsepower in the new V-8 through 1951. Until then they had nobody on their tail.

There are other reasons for ever-increasing power. One is weight. In 1949 the engine in the Olds "88" toted 3,900 pounds of car over the road, including the few accessories. In 1956 the engine is burdened with 4,500 pounds of multi-accessoried car. A lesser reason is the power losses in such things as air conditioners, power steering and automatic transmissions, amounting perhaps to less than 20 horsepower.

How much more power this engine will yield in the future is a question that nobody will wager on, least of all the engineers. Based solely on compression-ratio arithmetic since 1949, it conceivably could be made to give up more than 400 horsepower at the 12.5:1 ratio built into Ket's experimental engine.

There are ifs—*if* the block could take it, *if* better valves were designed, *if* the petroleum industry could supply the diet —and if the nuts are kept on the automobile and out from behind the steering wheel.—*Devon Francis.*

NEXT MONTH . . . How to Choose a Geiger Counter

THINKING of buying a Geiger counter for uranium hunting? Which of the dozens that are on the market, with all kinds of gadgets and price tags, will serve you best? In the January issue of POPULAR SCIENCE MONTHLY, an article on how to choose a Geiger counter will offer expert advice to guide you when you go shopping. From practical experience the author, Griff Borgeson, compares the features of current models and tells which are most desirable—and why.

Copyrighted material

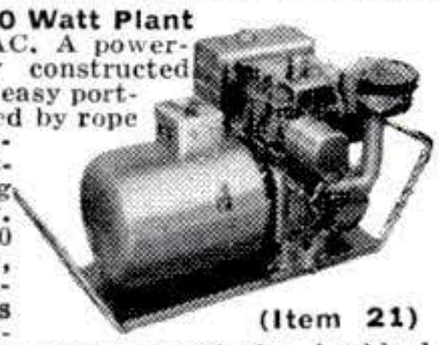
PORTABLE LIGHT PLANTS

1300-1500 WATT PLANT

115v. 60 cyc. AC Push Button Start. Powered by a 3½ HP. Clinton engine. Combines big output with easy portability. Provides emergency power for operating any oil burner, sump pump, freezer, television, lights, communications systems, etc. which require up to 1500 watts. (Item 22). Wt. 110 lbs. Reg. $475 value, Factory price... **$239.50**

1750 Watt Plant Powered by 4.5 Briggs engine. Electric starting & battery charging built-in! Factory price... **$279.50**

MASTER-LITE 2500 Watt Plant



(Item 21)

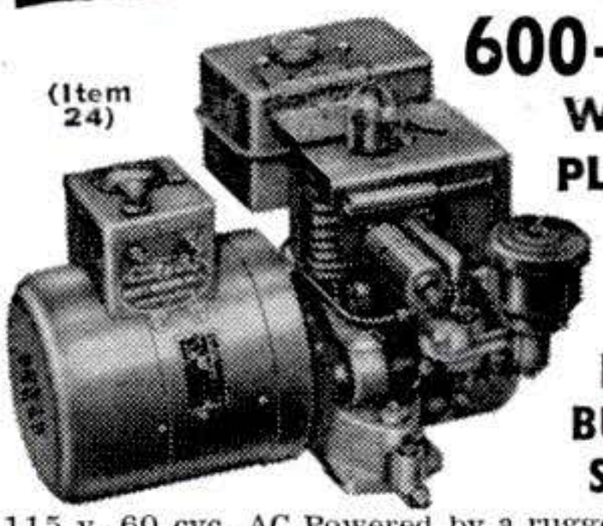
110/120 v. 60 cyc. AC. A powerful plant, ruggedly constructed and yet designed for easy portability. Can be started by rope or built-in 12 v. electric push button starter. Built-in winding to charge battery. Powered by a big 5.10 HP Briggs engine, complete with all accessories. Includes control box, voltmeter, and handy plug-in power receptacle. An ideal plant for permanent or stand-by service. Wt. 225 lb. Reg. price $645.00 (Item 21) Factory Price **$329.50**

3500 Watt Plant Push Button Start (Item 23) 115 v. 60 cyc. AC. Similar to above, but larger and 33% more capacity. Wt. 270 lbs. Reg. $760. Factory Price.....**$379.50**

DUAL VOLTAGE 110/220 for any of above plants—$30 additional

get MASTER MECHANIC'S BEDROCK FACTORY PRICES

600-700 WATT PLANT



(Item 24)

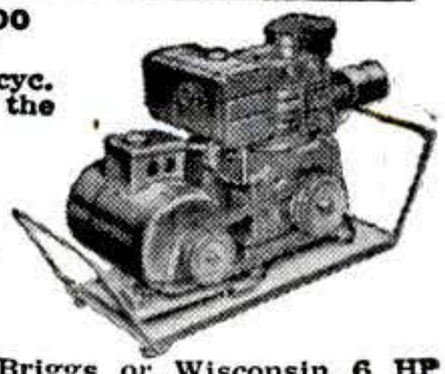
PUSH BUTTON START

115 v. 60 cyc. AC Powered by a rugged 2 HP. easy starting Briggs engine. No wiring necessary; just plug in and operate. Plenty of current for any oil burner, freezer, brooder, emergency lights, etc. which require up to 700 watts. Ideal for television and radios. Complete with voltmeter and built-in winding to charge 6 v. auto batteries. (Item 24) Wt. 75 lbs. Easily fits in car trunk. Be prepared if storm knocks out power lines. Regular $275.00 value..... **$143.50**

1000-1200 Watt Plant (Item 45) same as Item 24 but larger generator and engine with 50% greater output..... **$199.50**

LESS THAN WHOLESALE

GIANT 2000-2500 WATT PLANT



110-120 v. 60 cyc. AC. absolutely the best made — exclusive dynamically balanced armature; heavy windings develop up to 5000 watt overload for motor starting. Skid mounted — portable. Powered by an easy starting Briggs or Wisconsin 6 HP engine—complete with all accessories; engine easily disconnected for other uses. Big outlet box, voltmeter, no wiring necessary. Ample current for all purposes. Factory warranty. (Item 31) Wt. 210 lb. Reg. price $585. Special at..... **$299.50**

Same plant with electric self starter (Item 31a)..... **$359.50**

Generator only and control box....**$169.50**

DUAL VOLTAGE 110-220 available on any of above models for $28.00 additional.

HI-LINE 6000 WATT PLANT
PUSH BUTTON START

(Item 162)

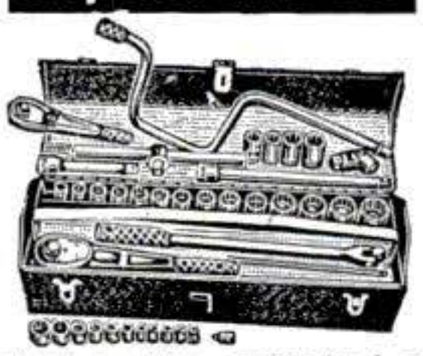
115/230 v. 60 cyc. AC. A brute of a power plant with a rugged 14.6 hp Wisconsin engine. Plenty of electricity for ranges, water heaters, freezers, pumps, machinery, etc. Affords both 110 and 220 volts. Ideal where heavy current is needed. Wt. 590 lbs. Easily worth $995. With crank start. Factory price. **$585.50**

Same plant but with self-starter **$645.00**

Generator and control box only, belt driven. Use your own engine or tractor. Wt. 240 lbs. (Item 163) Factory price..... **$345.00**

We make every type and size of light plants—Write, giving us your requirements!

52 pc. SOCKET SET



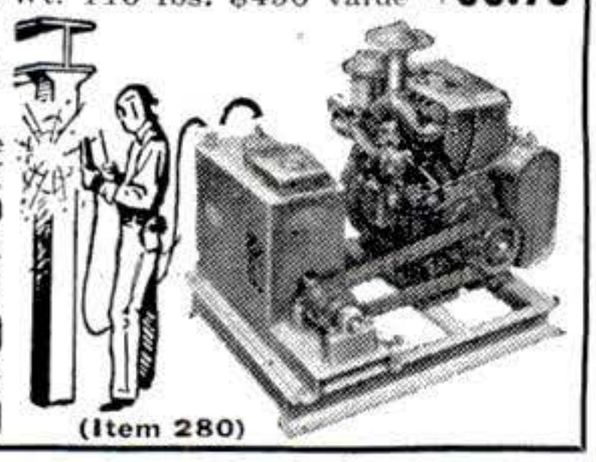
Highest quality, guaranteed non-breakable sockets made by Husky. Beautifully matched chrome thin wall alloy absolutely the best. Contains a complete set of 28 sockets in ½" drive, ⅜" drive and ¼" drive, plus all necessary extensions, handles, speeders, reversible ratchets, etc.; all uncond. guaranteed against breakage. A beautiful set of tools that will handle any job; in a big doghouse steel box. Wt. 17 lbs. (Item 205) List price $62.90. Factory Special.....**$27.95**

MASTER MECHANIC'S DC ARC WELDERS

Built in our own factory, these big, industrial capacity, portable welders provide terrific performance, yet are sold direct-to-you at bedrock factory prices—hundreds of dollars less than you'd expect! Senior model (shown in illustration, left) has high capacity DC welding unit—easily welds any thing up to 2" plate using 1/16" to ¼" rods. Built in stabilizer and cooling system makes arc easy to strike and hold. Dual control rheostat provides low heat soldering, brazing, and welding from 30 to 300 amps. Comes complete with instructions, guarantee and triple V-belt or flat pulley. Easy to hook up and easy to operate.

WELDER ONLY — DUAL CONTROL MODEL. Same as above—drive with your tractor, jeep or gas engine of 14 HP or more. (Item 38a). Wt. 110 lbs. $450 value **$99.75**

THE POWER MASTER



(Item 280)

WELDER ONLY—STANDARD MODEL. Same as above but with single rheostat for heavy metal welding only (Item 38). Wt. 110 lbs. $400 value. Special. **$99.75**

COMPLETE POWER MASTER. (Illustrated at right) powered by a 14.6 hp., air cooled Wisconsin engine. Wt. 480 lbs. (Item 280) Compares with welder costing $1200. Factory Special..... **$449.50**

WELDING KIT. Two 10 ft. leads, welding helmet, electrode holder, ground clamp. Sold only with welder at. **$10.50**

HEATING & VENTILATING FAN

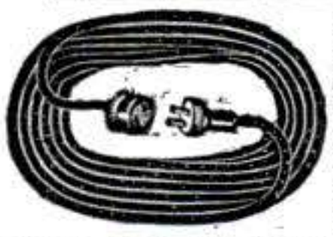
(Item 10) Easily installed in furnacepipes. Forces even heat to all rooms. Overrange removes kitchen smoke and odors. Powerful continuous duty motor. 110-120 v. AC. Mount in wall or ceiling to ventilate any area. Quiet, super efficient fan moves huge volume of air. (400 to 600 c.f.m.)

8" Pipe, wt. 5 lb.....**$6.85**
9" Pipe, wt. 6 lb.....**$7.85**
10" Pipe, wt. 7 lb.....**$8.85**
12" Pipe, wt. 8 lb.....**$9.85**

HEAVY DUTY FAN. Semi-enclosed motor, suitable for spray booths, restaurant exhausts, poultry houses, etc.

10" Fan, wt. 8 lbs. (Item 10E).....**$11.95**
12" Fan, wt. 10 lbs. (Item 10D).....**$12.95**

EXTENSION CORD



100 ft. extra heavy duty, made of specially insulated No. 14-2 conductor wire, neoprene covered. (So **tough that you can drive a truck over it**), yet amazingly flexible and easy to handle. Resists oil, grease or water—use indoors or out. Complete with heavy rubber plug and outlet. Wt. 9 lbs. (Item 185) Usually $15. *Special* 100 ft.....**$8.95**

No. 10-2 POWER CABLE. Heavy duty, very flexible, rubber covered, 50 ft. with male and female fittings. Wt. 9 lbs. (Item 592a) **$10.45**
50 ft. without fittings (Item 592)....**$9.45**

NO. 12-2 POWER CABLE. Very flexible rubber covered, special outside shield for grounding power tools, etc. 50 ft. (Item 199) wt. 8 lbs. **$6.95.** 100 ft. (Item 200).....**$12.95**

JET FLOW BLOWER

Tremendous air movement (1800 CFM) and quiet operation make this double inlet 10" turbine blower unbeatable for heating, cooling, drying and air conditioning. Ideal for attic or barn ventilation, converting gravity heating to forced air; spray booth exhausts, etc. Operates with any ¼, ⅓ or ½ HP motor. Oversized, long life bearings. Includes variable speed motor pulley and belt. Dimensions 19" hi x 18" x 16½". Outlet opening 13" x 11⅜". Wt. 45 lbs. Item 245. Reg. $54.50. Factory Special..... **$29.50**

HEAVY DUTY ¼ HP motor for above blower..... **$17.95**

12" TURBINE BLOWER Similar to above, but larger with 2400 CFM capacity. Wt. 65 lbs. (Item 245a) Reg. $70.00. Factory Spec. **$34.75**

CONDITIONAIRE VENTILATING FANS

Save big money installing your own exhaust fan. Efficient propellor type blade moves huge volume of air quietly and effortlessly. Heavy welded frame — predrilled for easy installation. Just cut opening and bolt in place. **Continuous duty** motors. Ideal for attics, restaurants, garages, barns, chicken houses, etc. Control manually or with thermostat.

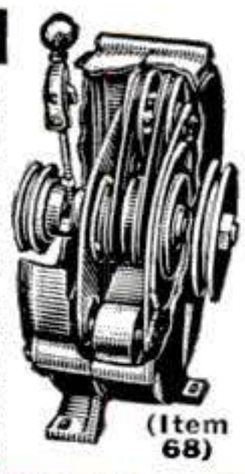
Blade	Opening	CFM	Wt.	Item	
16"	18¼"	2925	19 lb.	365a	$27.95
18"	19¼"	3600	27 lb.	365b	$31.95
20"	21¼"	4100	30 lb.	365c	$39.95

THERMOSTATS: BARN type (range 40°-60°). Wt. 2 lbs. **$6.95.**

JET STEAM MASTER

Now, a super efficient portable steam generator that produces live steam at 100 lbs. pressure in 60 seconds from a cold start! Produces large volume of high pressure steam on 2 pints of fuel oil. Instantly cleans sticky grease, dirt, rust, old paint, etc. off implements and road machinery. Pays for itself in a few weeks. Sterilizes soil. Sterilizes as it cleans—milk equipment, etc. **Fully automatic—oil** fired with **new, built-in lifetime bronze water** circulating pump. **Draws water from faucet** or bucket. Simple **and safe** —anyone can **use** it; built-in safety **valve.** Complete with 12 ft. of hi-pressure **steam** hose and new triple efficiency steam gun **that** automatically mixes **in soap** solution if desired. Wt. 250 lbs. **Item 463.** Special factory price..... **$329.50**

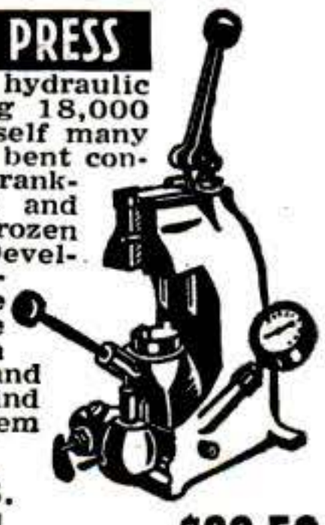
Variable Speed Selector



(Item 68)

Heavy duty, made by **B. F. GOODRICH** for industrial use. **Provides instant** speed changes **for** any **drive.** For machine **tools,** dryers, printing, conveyors, production lines, hoists—any operation requiring variable speed. Employs reliable "trouble free" planetary **system.** No hydraulic power **losses.** Infinite range, smooth **operation,** easy installation. **3** sizes: ½-1 hp. 36 lbs.; **1-2** hp. wt. 55 **lbs.;** 2-3 hp. wt. 105 lbs.; Reg. **list** $228, $252 and $352. Our prices . . . **$79.50, $89.50** and **$114.50**

9 TON HYDRAULIC PRESS



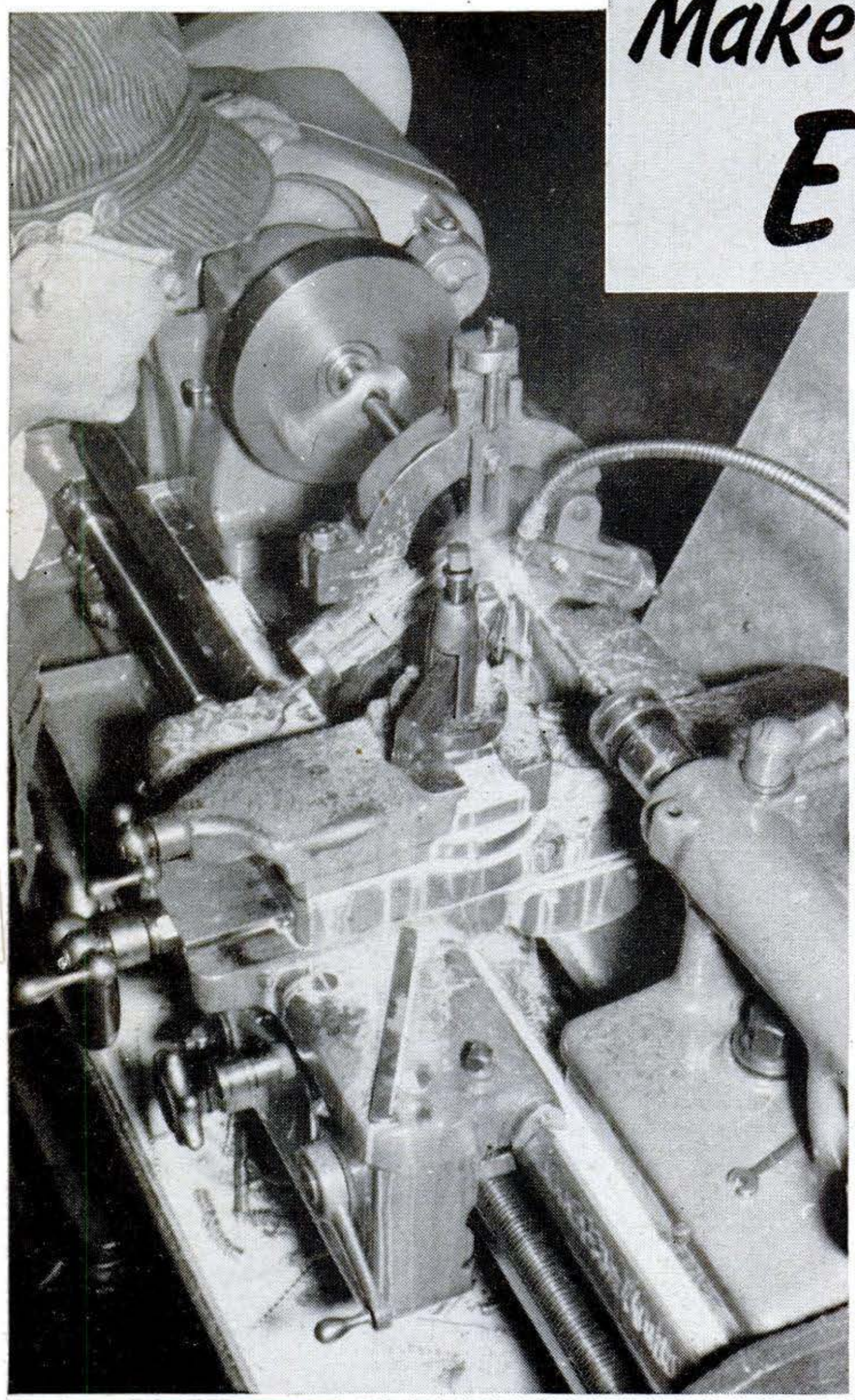
A tremendously powerful hydraulic press, capable of exerting 18,000 lbs. pressure. Pays for itself many times over—straightening bent connecting rods, king pins, crankshafts, axles, link pins and bars — or pushing out frozen bearings and bushings. Developed pressure under precise control and visible at all times on accurate gauge. Complete with both large and small anvils and jigs to straighten any kind of curve or bend. (Item 464). Wt. 110 lb. Actual list price $365. Our special close-out price..... **$69.50**

Send check or M.O. Prices f.o.b. Factory. 10 day Money back guarantee. SEND 10c for . . . BIG 1956 Catalog

MASTER MECHANIC MFG. CO., DEPT. 69-L Burlington, Wis.

Copyrighted material

SOUTH BEND 14½" LATHES



Make Tough Jobs EASY

When tolerances start slowing up output, then is the time you need South Bend 14½" Lathes. Many plants have found they can save manhours and material by running the tough operations on these precision lathes — this is the type of work they do best. Their versatility enables you to keep them busy on a wide variety of work with a minimum of set-up time. Many attachments are available for special classes of work. Find out now how these lathes can give you efficient machining — *mail the coupon below today.*

BASE PRICE $1809

SPECIFICATIONS

SWING: 14⅝" over bed and saddle wings; 10¼" over saddle with chip guard removed.

BED LENGTHS: 5, 6, 7 and 8 feet.

DISTANCE BETWEEN CENTERS: 24⅛ to 60⅛ inches.

COLLET CAPACITY: 1 inch.

SPINDLE BORE: 1⅜ inches.

SPINDLE SPEEDS: Eight . . . 30 to 875 r.p.m.

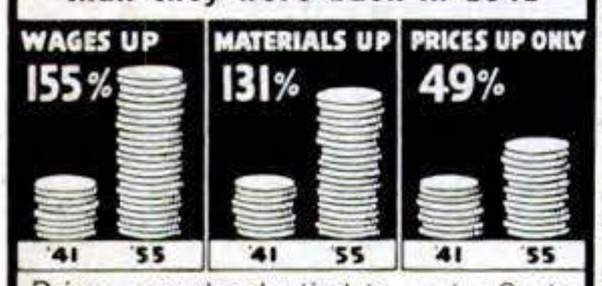
POWER LONGITUDINAL FEEDS: 48 R.H. or L.H., .0015" to .0841".

POWER CROSS FEEDS: 48, .0006" to .0315".

THREAD CUTTING: 48 R.H. or L.H. pitches, 4 to 224 per inch.

CROSS SLIDE TRAVEL: 10 inches

Compared with our costs
OUR PRICES ARE LOWER
than they were back in 1941



Prices are closely tied to costs. Costs are still rising. Buy now before increased costs necessitate higher prices.

SEND INFORMATION CHECKED:

☐ 9" and 10" BENCH LATHES ☐ 10" to 16-24" FLOOR LATHES ☐ DRILL PRESSES ☐ TOOL GRINDERS ☐ ½" & 1" Collet TURRET LATHES ☐ 7" BENCH SHAPERS

Name_____ Street_____

City_____ State_____

Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana

Copyrighted material

WELLER TOOLS

MAKE A MERRY CHRISTMAS FOR ANY HANDYMAN

TO GIVE OR RECEIVE . . .

Ideal Gifts For Hundreds of Homecraft Jobs

This **POWER SANDER AND POLISHER** puts satin-smooth finishes on new wood in just a few effortless minutes; sands down old paint fast and easily; feathers dry-wall seams perfectly; and polishes waxed surfaces to a handsome, high gloss. With 14,400 *power* strokes a minute the Weller Sander is almost impossible to stall. *25 square inch sanding area* is twice that of comparable tools; *straight-line action* sands with the grain, goes all the way into corners. Low design, *less than 3'' high*, goes under low places.

WELLER POWER SANDER
$14.95

WELLER SOLDERING KIT
$7.95

COMPLETE SOLDERING SET includes everything needed for joining metal parts, making electrical connections, sealing leaks and seams. *Weller Soldering Gun* heats in 5 seconds, has triggermatic control and 2 spotlights; *Wire Brush* cleans parts to be soldered; *Soldering Aid* makes tight wire twists; with famous *Kester Solder* . . . all in a handy storage case. Ideal too, for model railroading and other hobbies.

AVAILABLE AT YOUR HARDWARE DEALER

WELLER Electric Corp. Easton, Pa.

Copyrighted material

WONDERFUL GIFT with a wonderful future . . . an Evinrude for Christmas! Passport to a new world of family recreation and adventure! A gift to thrill every member of the family with the promise of fun-filled holidays for years to come. *And so easily yours!* See your nearby Evinrude dealer . . . let him show you the fabulous '56 line of 9 *Whispering Power* Evinrudes —3 to 30 horsepower—a model just right for powering every type of family boat, smallest runabout to smart and able cruiser. Now, 3 models with finger-touch electric starting. Ask about the Evinrude gift certificate plan, with a modest deposit now and delivery priority for your Evinrude whenever you say the word. Your old motor brings top trade-in *right now!* Look for your dealer's name under "Outboard Motors" in your phone book. For free full-color catalog of the complete Evinrude line, write **EVINRUDE MOTORS,** 4162 N. 27th Street, Milwaukee 16, Wisconsin.

a Whispering Power Evinrude for Christmas

A Division of Outboard, Marine & Mfg. Company
In Canada: Manufactured by Evinrude Motors, Peterborough

Evinrude

Pioneers in quiet Outboard Motors